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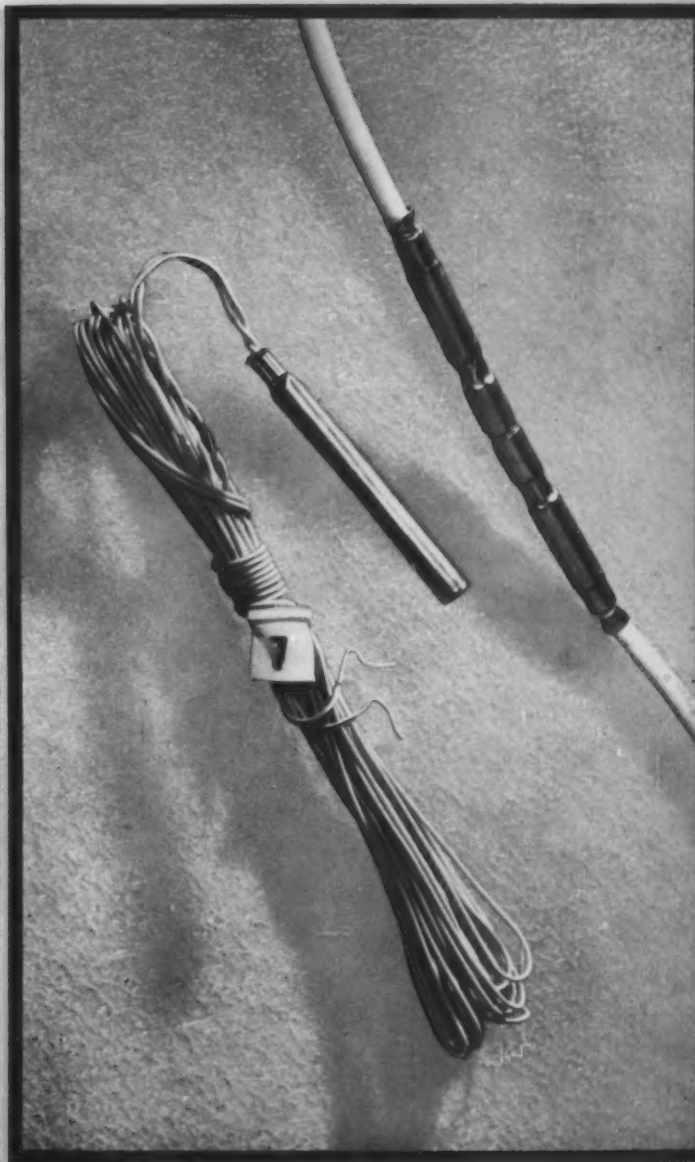
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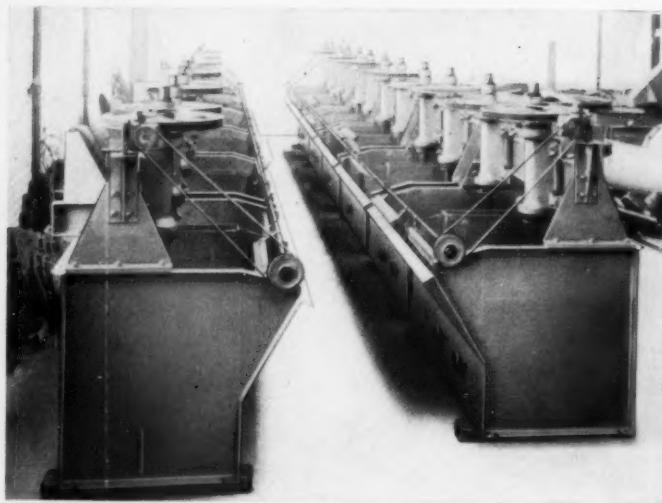
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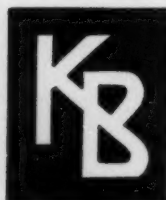
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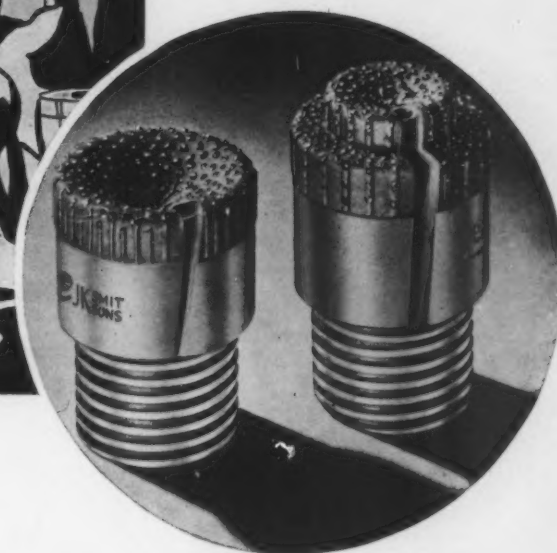
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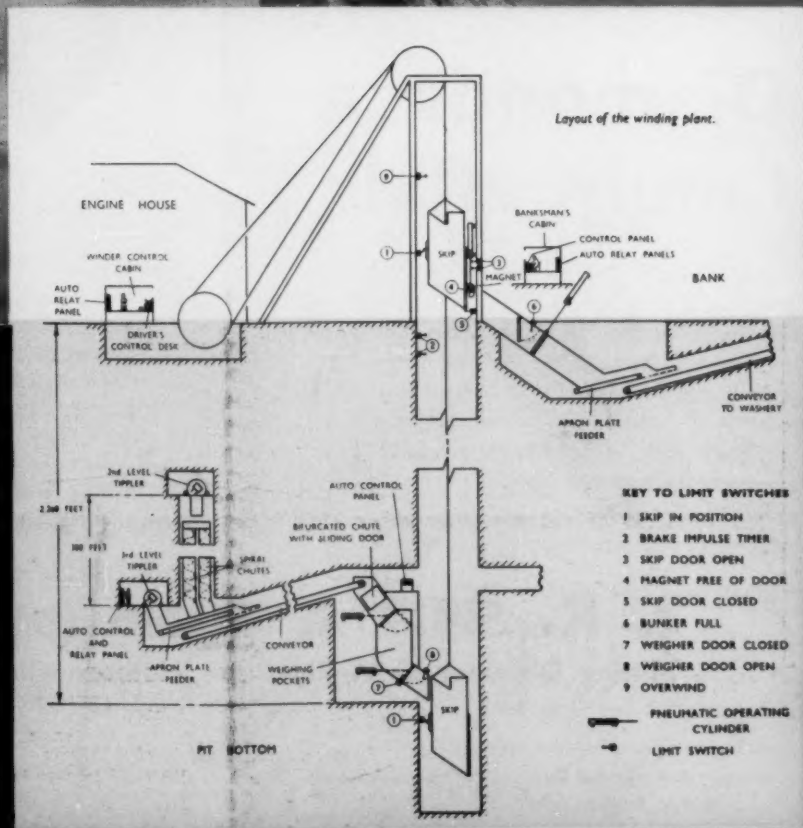
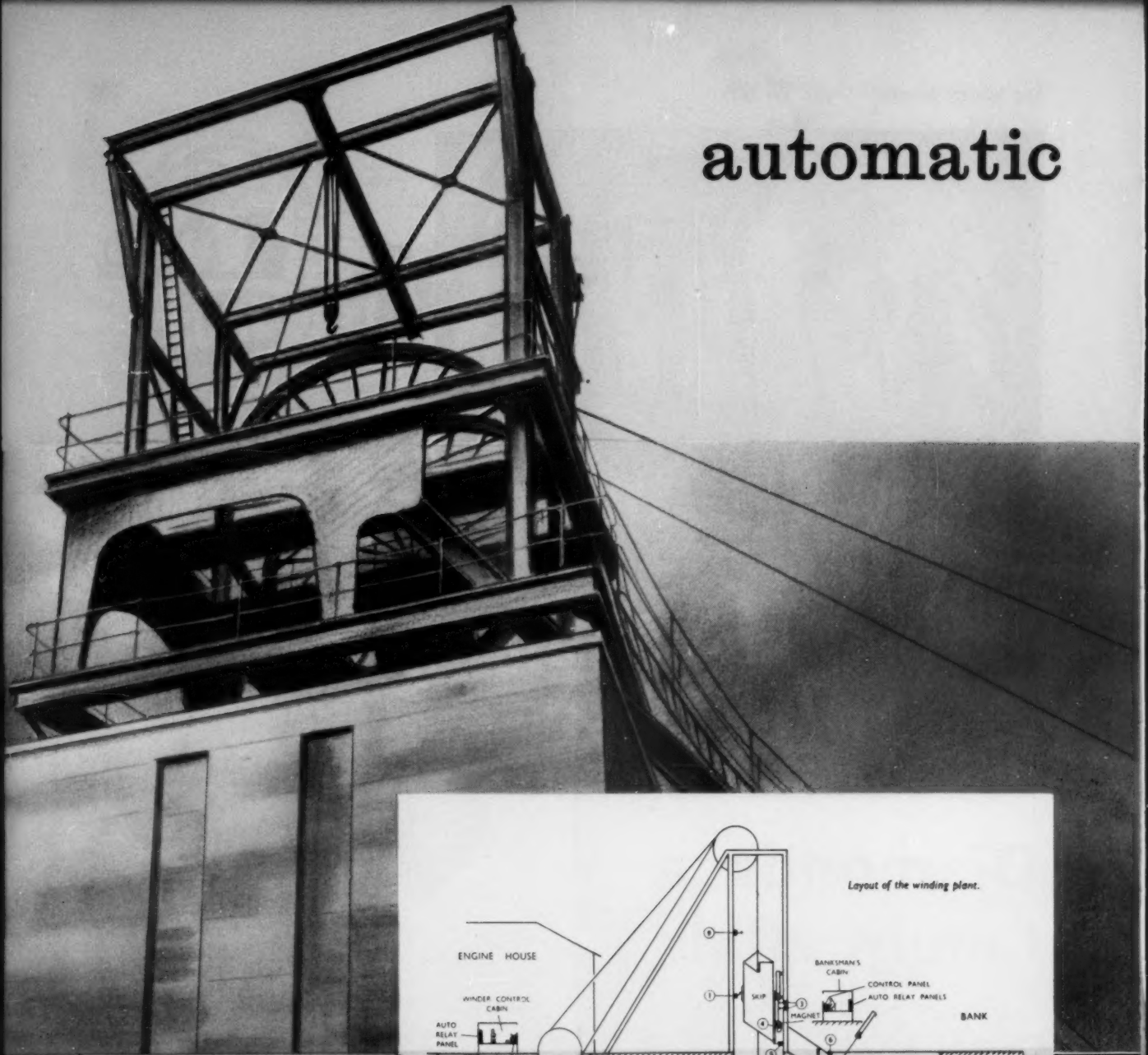
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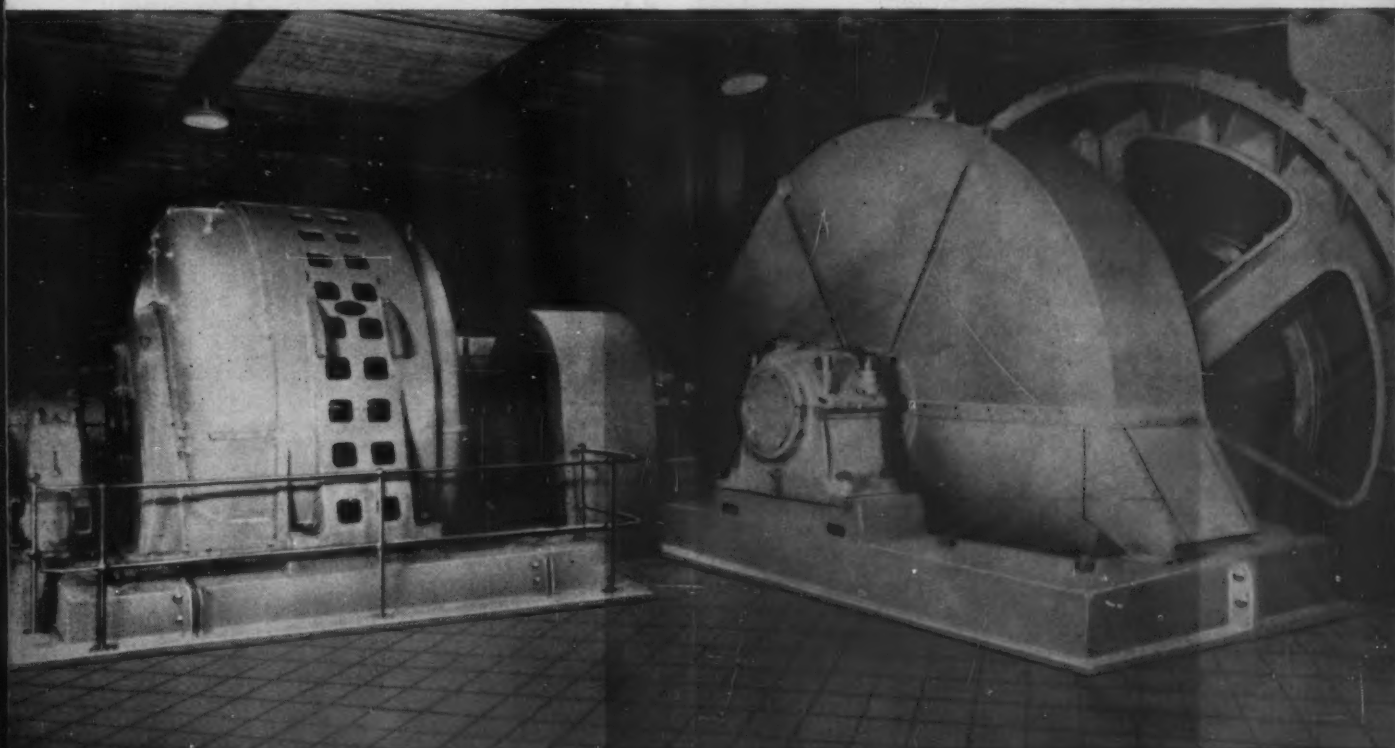
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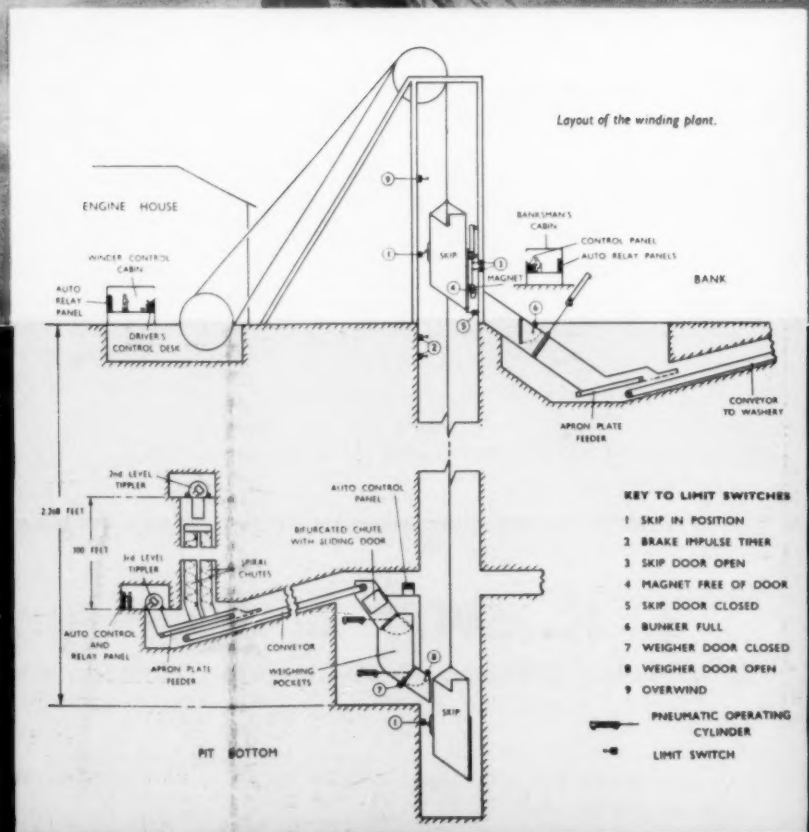
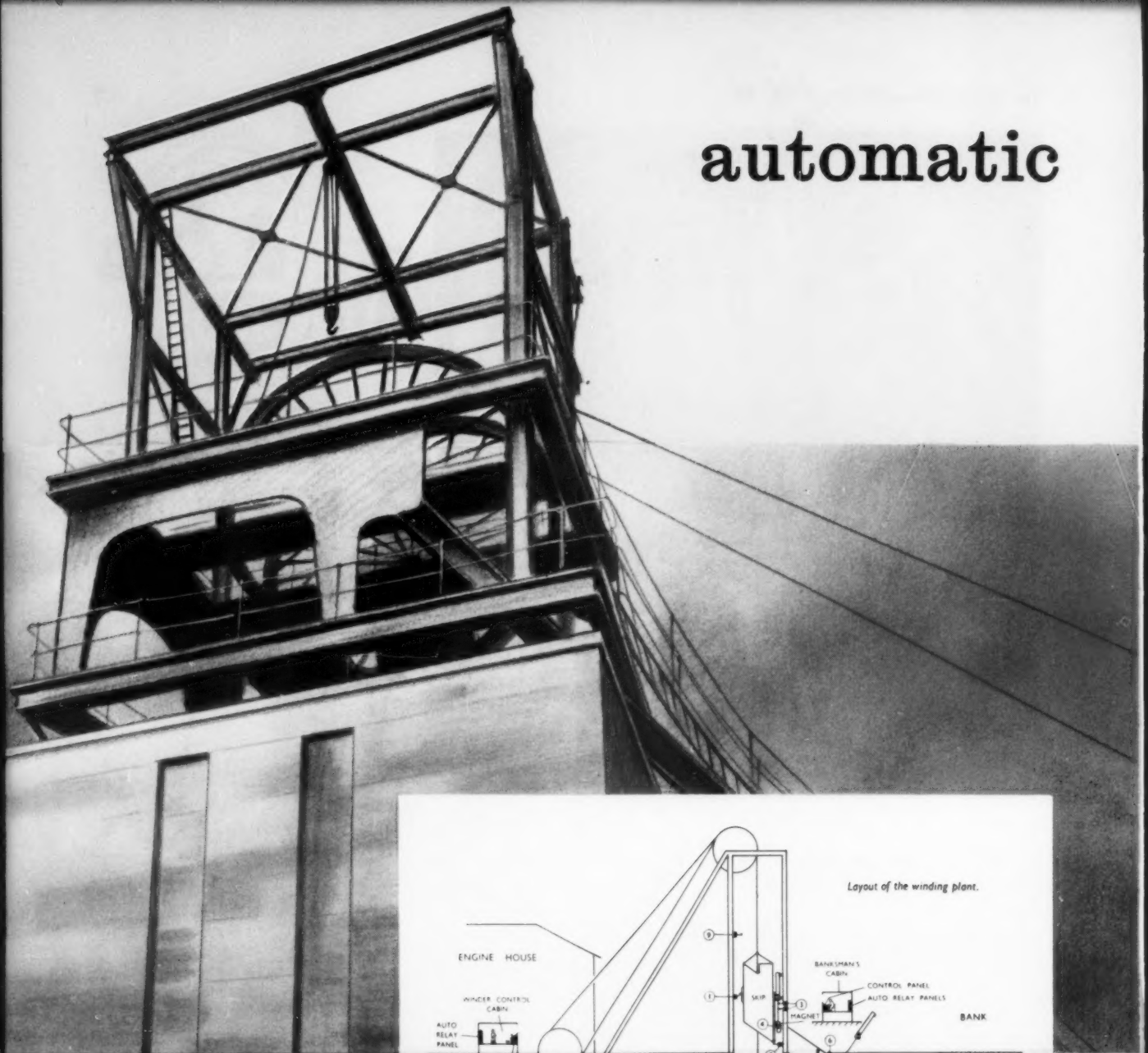
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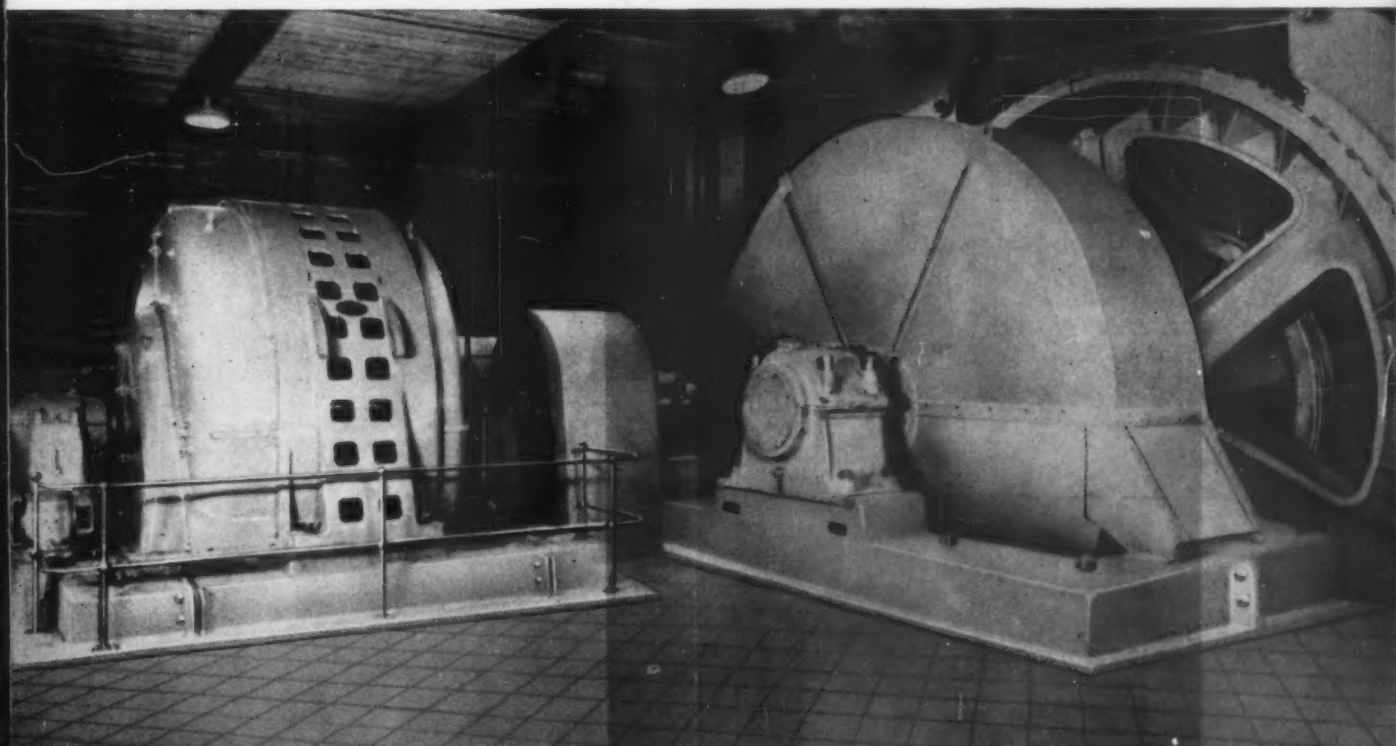
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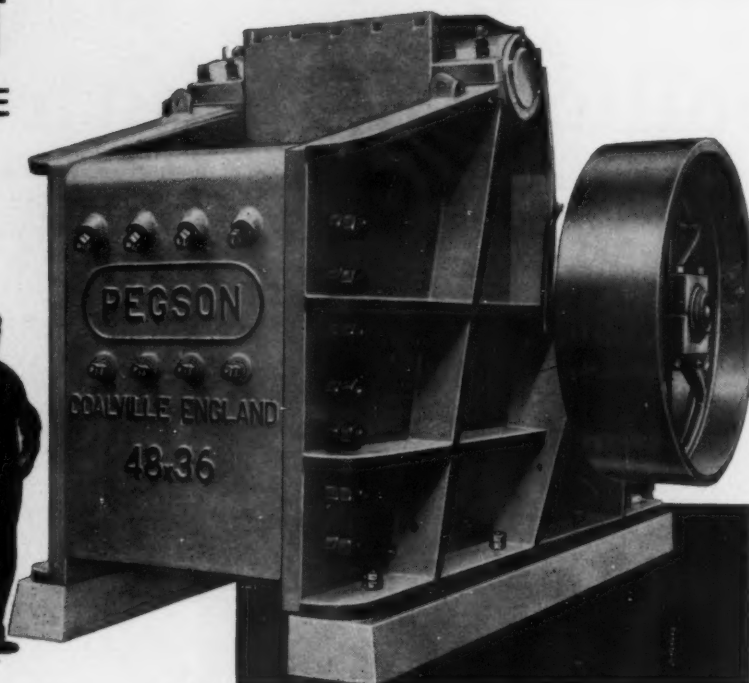
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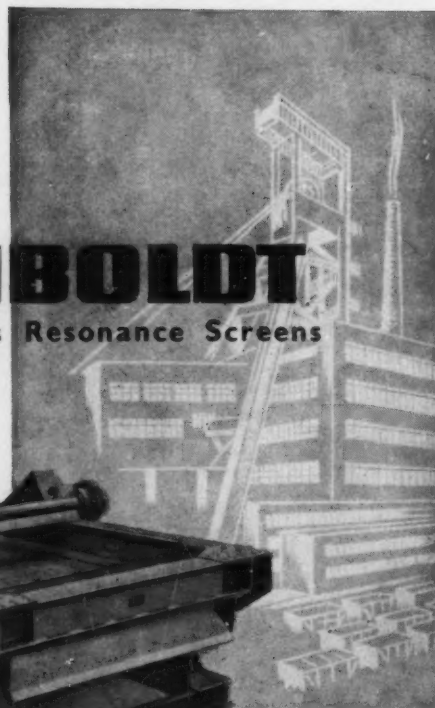
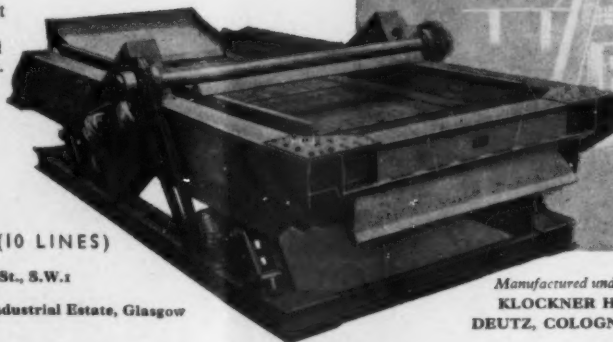
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Kalgoorlie fights rising costs

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An Atlas Copco rock drill operating in a confined space at the gold mines of Kalgoorlie.

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The Mining Journal

London, August 15, 1958

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Raw Materials for the Nuclear Industries

THE epic voyage of the *Nautilus* under the Polar ice, together with the United Nations report on the new hazards arising from man-made radiation, have once again focused public attention on the truly immense potentialities, for good or evil, of nuclear power. The horizons are dramatically widening and it may well be that new vistas not yet discernible by our boldest scientists have still to be uncovered—provided that we prove capable of using this limitless source of energy for the advancement and not the destruction of mankind.

For the mining industry the \$64,000 question — as the Americans put it—is the extent of the market for uranium several years hence, when government contracts are expiring and the nuclear industries are still quantitatively at an early stage. Looking beyond this critical period, there can be little doubt that, failing any entirely unforeseen development, the world will eventually require all the uranium that can be made available.

Widely varying estimates of uranium requirements in the next decade have been published. So many factors are involved that any figures put forward can only be regarded as tentative, however well informed the source. Moreover, the premises on which even the most authoritative forecasts are based are always liable to be modified by such unpredictable happenings as the slowing down of the U.K.'s nuclear power programme last year. On the credit side, it is to be expected that the exploits of the *Nautilus* will accelerate the use of nuclear propulsion for naval vessels and it is conceivable that it might even lead eventually to commercial transport by submarine. In this connection it is interesting to note that the use of nuclear-powered submarines to bring out iron ore all the year round from Canada's frozen north has already been suggested. Although experience with the *Nautilus* indicates that the quantity of fuel consumed by atomic submarines or surface craft is remarkably small, this development provides uranium producers with a further market which might become important if nuclear propulsion eventually becomes extensively used at sea.

In its annual report for 1957-58 the Atomic Energy Authority states that for the present it is not proposing to make any additional commitments for the purchase of uranium. The Authority recalls that when its report for 1956-57 was written, the supply and demand for uranium appeared to be more or less in balance for the foreseeable future, neither great shortages nor over-supply being anticipated. Conditions have since changed, and it is now thought that for some years at least more uranium may be available than will readily be bought. This is principally because uranium supplies, particularly in the U.S., have been developed much faster than was foreseen.

It is noteworthy, however, that despite its own lower requirements, the Authority continues to encourage prospecting and the development of reserves for the future. Moreover, the possibility can scarcely be excluded that the present strength of sterling, together with the more uncertain outlook for trade and employment, might cause the British Government to rephase the atomic energy programme by at least partial restoration of the former schedule.

Presumably the Authority would then reconsider its purchasing commitments in the light of its greater needs.

Whatever the supply position in the U.K. itself, there will certainly be increasing demands for uranium for nuclear power in many countries. The limited domestic resources of one large future consumer are surveyed in the recently published report of Euratom, to which reference was made in our previous issue (*The Mining Journal*, August 8, 1958, p. 145). The main source of uranium in Europe is France. Mines have been opened in four mining centres, there are proved reserves of 15,000 tonnes of metal, and reputed resources total 100,000-150,000 tonnes. Two treatment plants in operation have a capacity, from present-grade ores, of about 350 tonnes of metal per annum, to which must be added 55 tonnes of uranium and 280 tonnes of thorium from the Madagascar deposits of uranothorianite until about 1963, when these will be exhausted. The treatment capacity of the French concentration plants is expected to reach 800 tonnes of metal next year and 1,500 tonnes by 1961. These quantities are far smaller than Euratom requirements.

Uranium production in the Belgian Congo has long been in the region of 850 tonnes uranium-content annually, but three-quarters of the output is under option to the Anglo-U.S.A. Combined Development Agency. In 1960, when this option expires, the known reserves of uranium in the Shinkolobwe mine will be down to 4,000 tonnes of metal. Prospecting for uranium is being continued in the Congo.

Some useful occurrences have been located in Germany, though very little uranium has so far been proved, and the Ellweiler concentration plant will have a capacity of about 150 tonnes of metal-content annually. A pilot plant is also being erected to treat the Wölsendorf (Bavaria) ores.

The Euratom Nuclear Fuel Agency will have an option on all fuel produced in or imported into the Six-Nation area, but in normal circumstances will act only as middle-man. The Agency does not propose to create a uranium stockpile, safety stocks being regarded as unnecessary in present conditions of supply.

A point which, obvious though it may seem, is perhaps worth stressing is that the importance of the nuclear industries as markets for minerals and metals extends far beyond radioactive minerals and the materials used as moderators or controllers or for structural purposes in atomic reactors. Atomic energy programmes have accelerated the development of such "new" metals as zirconium, hafnium and beryllium, but they are also consuming increasing quantities of many materials of established commercial importance. The requirements of the nuclear industries range from aluminium, columbium and nickel to asbestos and barytes; they include the older major metals and even extend to gold.

Indeed, there is scarcely a metal or mineral known to industry which is not playing some part, directly or indirectly, in the production of atomic power.

NEPAL'S INDUSTRIAL POLICY

A statement of industrial policy has been issued by the Government of Nepal, which reiterates its belief that private investment and enterprise, both national and foreign, should play a major role in the industrial development of the country. The declaration makes no specific reference to mining.

All industries except the manufacture of arms, ammunition and explosives are open to private enterprise, but the government proposes to take the major part in public utilities such as railways and electricity generation.

Foreigners or foreign registered bodies will be allowed to register firms to undertake the management of industries. The parent concerns in capital exporting countries will be allowed to control such industries for an agreed period of time. Specific concessions may be negotiated between the government and investors, both national and foreign. Foreign investment will not be subject to double taxation. Foreign investors will be allowed to repatriate their profit and capital, according to the terms of the Agreement.

Concessions to industries, irrespective of their ownership, include the following: Making necessary land available, if state-owned, at a concessional price or rent; provision of foreign exchange; tax relief as far as possible for the import of capital goods, stores and raw materials; reasonable tariff protection; power to be provided at lowest possible rate; timber and forest products at concessional rates, and priority in the allocation of controlled commodities.

Other measures to encourage industry will include development of power, transport and communications; suitable labour legislation; revision of the Companies Act, and special provision to provide prompt handling of legal cases involving industries.

U.S. RESEARCH PROGRAMMES

A stepped-up search for domestic sources of beryl, coupled with mining and metallurgical studies aimed at supplying fast-growing needs in the missile, aircraft and atomic energy fields, are major features of the research programme for this mineral to be undertaken by the Bureau of Mines, U.S. Department of the Interior, during the fiscal year 1959 that began on July 1, the Bureau has announced.

The Bureau will increase cataloguing, classifying and evaluating of all known occurrences of beryl and associated minerals and re-examine all known pegmatite areas. It will also seek improved methods for mining and recovery of beryl minerals and the processing of beryl concentrates. A simple, quick and reliable field test for detecting small quantities of beryl intermixed with other minerals will be sought.

Methods of producing cheaper and better columbium and tantalum metal, alloys and compounds for nuclear reactors and other important uses are being emphasized in the columbium-tantalum research programme, which will be carried on at the Bureau's Northwest Electro-Development Laboratory, Albany, Oregon. It will range from experiments to improve extraction of columbium and tantalum from Idaho euxenite ore to production of high-purity metals for nuclear reactor applications.

The solvent-extraction process developed by the Bureau of Mines for producing separated columbium and tantalum oxides is already being used commercially, but research workers will continue to try to improve both the process and the quality of the products it yields. Fractional distillation of the chloride will be studied as an alternative, and possibly more economical, method.

Metallurgical studies to develop economic methods for using America's large resources of zirconium and hafnium minerals are the basis of the research programme for these metals. The Bureau will also investigate and appraise domestic sources of zirconium and hafnium, conduct basic research both in mining and processing their ores, assist other Federal agencies on problems of zirconium-hafnium supply and technology, and collect and interpret economic and statistical data on both metals. Most of this research will be conducted at the Bureau's Northwest Electro-Development Experiment Station in Albany, where zir-

conium was first produced in commercial volume by the Kroll process.

During the fiscal year four laboratories will participate in research on bauxite and aluminium. The Bureau will continue a critical review and analysis of processes for the production of alumina from non-bauxite raw materials of domestic origin. The results of this study will be published as a comprehensive report.

Work is continuing which should lead to increased efficiency in recovering bauxite in underground mining. The early phases of this study include determination of stress patterns, water conditions, and physical properties of the Arkansas bauxite deposits, as well as the formations immediately above and below them. Since this is one of the first studies of this type on non-fuel minerals, the results are expected to be useful in other mining areas.

Research is progressing on beneficiation and extractive processes for utilizing low-grade aluminium material such as ferruginous bauxite in Oregon and sub-marginal bauxite ores in Arkansas.

Research on ways of producing high-purity boron and determining its characteristics will be accelerated in efforts to provide more technical information which can aid commercial production and increase utilization of this versatile element.

Reduced dependence on foreign sources of asbestos — 95 per cent of which is now imported — will be the principal objective of Bureau of Mines research on this essential mineral. The asbestos programme will include examination of domestic outcrops of asbestos-bearing serpentine, studies of the various forms in which asbestos occurs, and development of methods for producing this mineral synthetically. Progress in making synthetic mica is viewed as an encouragement to research on the production of a synthetic asbestos fibre.

A new model of a phosphate-rock planer, designed by the Bureau of Mines, will be tested in an underground phosphate mine in Utah as part of a programme to increase recovery of this commodity through mining and metallurgical research. The Bureau will also study improved beneficiation methods for both western and south-eastern phosphate rock. Large tonnages of phosphate rock are by-passed because they cannot be upgraded by present methods.

The tungsten programme will stress research in preparing and evaluating high-purity metal. Resource studies, including beneficiation of ores, will continue, but at a slower rate. The increased emphasis on processing research is in response to national requirements for superior engineering materials, particularly metals and alloys, that can withstand high temperatures. Tungsten, with a melting point higher than any other metal, 3,410 deg. C., has a potential for increased use either by itself or as a component of high-temperature alloys.

The Bureau will also continue to collect and interpret statistical and economic data as a basis for its own research and as a guide for industry and government planning.

THE HUNGARIAN COAL INDUSTRY

Official Hungarian publications report that the country's coal production in the first quarter of 1958 at 6,140,000 tonnes reveals a rise of 50 per cent above the output registered in the similar period of 1957. However, this output is still slightly below that of the comparable first quarter previous to the uprising in October, 1956.

Brown coal accounts for almost three-quarters of Hungary's coal output and of the remainder rather less than 40 per cent is bituminous coal. Consequently, the country

seems to be experiencing the same problems as many other West European nations; i.e., a surplus of inferior coal and a shortage of top-grade bituminous. The excess brown coal is being stockpiled at the power plants.

RUSSIAN STEEL MARCHES ON

Wide publicity has been given to the pronouncement of the British Iron and Steel Federation that, in the absence of corrective action, the national output of steel will continue to run appreciably below capacity for another twelve months. Still more disturbing is the hint that the failure of the U.K. economy to maintain its normal growth has put in doubt the whole of the assumptions on which the steel industry's £600,000,000 development plan is based. As yet, the prosecution of that plan has neither been halted nor modified, and having regard to the vast expansion schemes planned by the principal producers abroad, it would be a thousand pities if the U.K. were to be driven to slacken the pace of its advance in aggregate capacity and in technical efficiency.

At the moment, world interest is so intensively focused on the political intentions of Mr. Krushchev, that the industrial achievements of the U.S.S.R. and the further plans for the exploitation of its almost limitless resources in more power and in mineral wealth have been allowed to pass almost unnoticed. Yet the fact remains that Russian steel capacity is advancing at a phenomenal rate and the pace is to be further accelerated by vast development plans which have already been approved by the Kremlin.

Two years ago a British mission was permitted to make an extensive tour of the principal Russian steel plants and a member of the delegation subsequently commented:

"Seeing is believing. In the days when Russia was completely cut off from the Western World, our mental attitude to the Five-Year Plan figures was somewhat sceptical. Nobody who took part in the visits to Russia will any longer, however, cherish any false impressions that the figures were mere propaganda, that the targets were unattainable, or that the industry was inefficient."

In the long-range development programme in the Urals, which the State Planning Commission has in hand, the building of this third Soviet ferrous metallurgical centre is to be accorded special priority. The projected output figures are colossal. From the Krivir Rog iron ore deposits in the Ukraine production is to be raised to 52,000,000 tons in 1960 and another new deposit in the Kuisk area now being opened up is scheduled to yield a comparable output around 1965.

Still greater mineral wealth is located beyond the Urals. It is stated that rich ore fields, and in close proximity deposits of coking coal estimated to amount to several thousand million tons, have been proved in the basin of the river Yenisci. These sources are to be tapped to feed blast furnaces capable of manufacturing 15,000,000 to 20,000,000 tons of pig iron per annum, and the plan further embraces the construction of two major steel mills in the Krasnoyarsk and Irkuls areas, and a third component in Western Siberia.

At the present rate of progress it has been estimated that 15 years hence the U.S.S.R. outputs would be: iron ore, 175,000,000 tons; pig iron, 73,000,000 tons; steel ingots, 99,000,000 tons. The new targets set by Mr. Krushchev are, however, considerably higher. He has demanded an annual output of 250,000,000 - 300,000,000 tons of iron ore, 75,000,000 - 85,000,000 tons of pig iron and 100,000,000 - 120,000,000 tons of steel, and Mr. Krushchev has ways and means of getting what he wants which are not at the disposal of the Western world.

Pre-cementation in Shaft Sinking

IN shaft sinking and underground development in South African mines one of the chief problems is to control underground water. Fissures, sometimes bearing very large quantities of water, are encountered from time to time, and as soon as they are first detected, the general practice is to inject cement under great pressure into the fissures to seal them off. While this process of cementation is taking place, other work is necessarily delayed — and delays in starting or developing a mine are costly.

During the last few years it has been the growing practice to drill long holes ahead of the area being developed underground so that cement can be injected into distant fissures and work in the area immediately ahead can proceed without frequent interruption. This technique, known as pre-cementation, is being used increasingly in the newer mines of the Orange Free State and the Far West Rand where heavy inrushes of water have occurred in the past.

Pre-cementation is particularly useful in shaft sinking, for when underground water has been encountered during sinking without this long-drilling precaution it has often been necessary to supplement normal cementation work in the shaft by additional cementation operations on a very large scale.

When pre-cementation is carried out to cover ground in the vicinity of a proposed shaft, the work is done from the surface. Large diamond drilling machines are used, the drills being fitted with crowns set with industrial diamonds. The drills are similar to those used for deep exploratory work. The diamonds form cutting faces that are highly resistant to wear when they are used in rotating drills of this type. For drilling holes of large diameter — such as in drilling for oil, when the hole may be 1 ft. in dia. — the drill crowns are set with diamonds of the order of 300 to

The following article is condensed from *Optima*, Vol. 8, No. 2, a quarterly review published by the Anglo American Corporation of South Africa.

500 cts. per crown. Holes for pre-cementation are much smaller and the crowns, which are about 3 in. in dia., are set with diamonds ranging from 8 to 20 per ct.

In the initial stages of shaft sinking, the drills are set up adjacent to the shaft site, and deep holes are drilled vertically just outside the area of the proposed excavations. As the holes are deepened, cement is pumped in at pressure at regular intervals in accordance with a carefully planned system. Sometimes the pressure is as high as 6,000 lb. p.s.i.

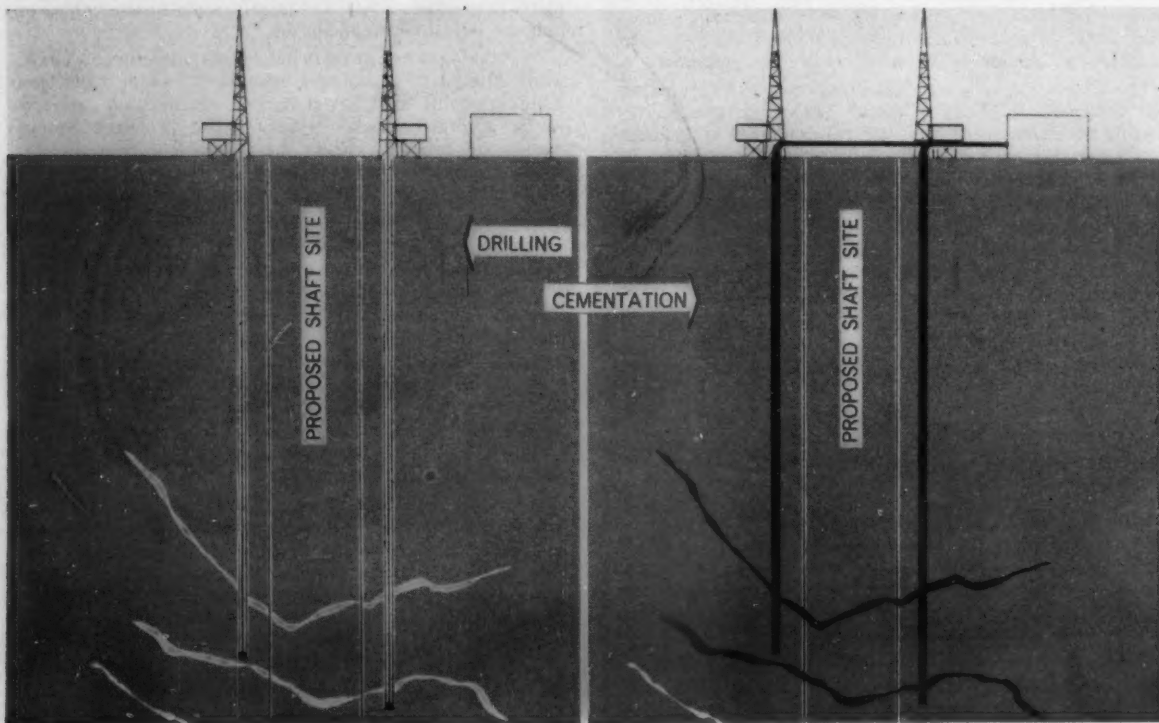
The accompanying diagram shows how the holes intersect any fissures that may be in the vicinity of the proposed shaft. Cement, pumped into the holes from time to time, fills the fissures, through which the shaft can later be sunk without the likelihood that work will be held up by inrushes of water. Drilling, of course, continues past the filled fissure to intersect any others that may lie below it, and which would, in turn, be filled with cement.

Surface pre-cementation was first used at the St. Helena mine in the Orange Free State some years ago. Since then shafts at the Harmony gold mine and Free State Saaiplaas have been successfully covered.

The system has been used with conspicuous success at a new ventilation shaft at the President Brand mine. By colouring the cement differently for each of three boreholes covering the shaft, it has been possible to identify the source of the cement when filled fissures have been intersected during shaft-sinking operations.

An extensive programme of pre-cementation is in operation to cover the new shafts being sunk at the Western Deep Levels mine on the Far West Rand.

Simplified diagram illustrating the principle of pre-cementation



Mining Taxation

REVENUE derived by a government from exploitation of mineral resources falls into one of the following classes: fees, rents, royalties, taxes and import and export duties. Fees are usually charged for a service rendered or an administrative action taken by the government; rents are based on surface area; royalties are fixed at a given percentage of production; and taxes are levied on income derived from exploitation or on specific incidents of such exploitation.

Revenue provisions often operate to make it financially onerous to retain exclusive exploitation rights in the absence of productive work. At the same time, those provisions often confer income tax advantages on the holder of a right. Petroleum legislation, according to the survey, appears to be highly developed in this respect.

The ECAFE Countries

Burma. The lessee of a mining lease must pay either a royalty at the rate specified in the lease, or a fixed yearly dead rent, whichever is the larger. He must also pay a surface rent. In case of default for two months the government may step in. Fees are charged for certificates of approval and prospecting licences.

Ceylon. A royalty on minerals won, or a minimum rent, whichever is the greater is levied on all mining leases.

China. A mining area tax and a mining production tax are payable in China. The former is imposed in addition to land taxes annually at a fixed rate both on mine prospecting areas and mine operating areas. If work on the right is suspended for more than two months for causes beyond the holder's control, exemption for such period may be applied for. Production tax is imposed at a percentage rate on the total price of mining production based on area average market price.

Hong Kong. Mining licences and leases are subject to such rentals, fees, royalties, premiums and other payments as may be prescribed. No details are given in the survey.

India. For minerals, a prospecting fee of not less than two annas and not more than one rupee per acre per annum, as fixed by the provincial government must be paid. For mineral exploitation, except for the first year, an annual dead rent is payable as follows:

	Minimum (Rs. per acre)	Maximum (Rs. per acre)
Coal	1	5
Iron ore	1	5
Bauxite	1	5
Mica	2	8
Gold, silver, platinum and other precious metals and precious stones	*	*
All other minerals except petroleum		10

(* Rates to be determined according to the circumstances of each case.)

A separate dead rent may be charged in respect of each mineral covered by a lease in the same area, subject to a proviso that the lessee is to pay either the dead rent or royalty, whichever is higher, in respect of each mineral, but not both. Surface rent is payable as may be specified by the provincial government in the lease.

Royalties are assessed as percentages of the sale value at the pithead of the mineral extracted in the case of coal, manganese ore, chromite, precious stones and gold, silver and precious metals, or at rates assessed by weight as in the case of mica and iron ore.

Indonesia. On each prospecting licence the government levies an annual land tax of 0.02½ guilder (½d.) per ha. and a gross production tax of 4 per cent on gross proceeds in excess of the first 5,000 guilders, which are exempt. On each concession is levied a land tax of 0.25 guilder (5d.) per ha. and a gross production tax of 4 per cent of the gross proceeds. If the concessionaire suffers a loss, a reduction may be made. Gross proceeds are based on the average market value over the previous six months. Special provisions apply to minerals treated by the concessionaire.

Japan. Fees are payable for mining leases and within 30 days from the date of receipt of the lease the holder must pay a registration tax in accordance with rules outlined in a ministerial ordinance. Should the holder fail to pay the tax, the lease loses its validity. No details of royalties payable are given in the survey.

Korea (Southern). A mining right has no validity if the registration tax is not paid within 30 days from the receipt of the grant of the mining right.

Pakistan. Prospecting licence holders must pay an annual fee and royalties at the rates specified in the third schedule attached to the rules. The rules also specify the rates of royalty, yearly dead rent and surface rent payable by the lessee of a mining lease.

Philippines. Rentals on all mineral lands of the groups including metals, or metalliferous ores; precious stones; salines and mineral waters; and various non-metals except fuels, are one peso per ha. annually. Failure to pay for a period of 90 days after demand causes the lease to lapse. Royalties on these groups of minerals of 1½ per cent of the actual market value of the gross output are payable. There is no deduction for mining, milling, refining, transportation, handling or other expenses, but ocean freight and insurance can be deducted on c.i.f. shipments abroad. Royalties are reduced by 5 per cent on mining carried out on private lands and this is paid by the lessee to the private owner. Failure to pay royalties for a period of 90 days after demand causes the lease to lapse.

An annual real estate tax is levied on all buildings and improvements, other than machines, instruments, appliances.

New mines, and old mines which resume operation, are exempted from income tax during the first three years of actual commercial production, but a complete return of capital investment at any time within the said period makes successive returns taxable from that year.

On coal lands, a royalty may not be less than 10 centavos a ton of 1,016 kg. The rental is determined at the rate of 2 pesos 50 centavos per ha. annually for the first ten years, and 5 pesos per ha. for each succeeding year. Rentals are credited against the royalties as they accrue each year. The rentals or royalties are also credited against the specific tax on coal assessed at 25 centavos a metric ton.

Sarawak. A mining lease is issued in return for the payment of such annual rent as may be stated in the lease and the lessee must pay rent and royalties as required under the provisions of the ordinance.

Thailand. Fees are charged for general and exclusive prospecting licences and for mining concessions. A con-

cession holder is liable to pay rent and royalties as specified in the schedule attached to the mining law on minerals.

Laos, Malaya, Viet-Nam (Southern). No details given.

Countries Outside ECAFE

Brazil. The Mining Code of Brazil provides for a tax based on the area to be prospected, a tax based on production value and an income tax. The concessionaire of a prospecting authorisation must pay in respect of the area to be prospected either 5.00 or 10.00 cruzeiros per ha. according to class, with a minimum of 300 cruzeiros. The production tax is limited to 8 per cent of the production value, including any other imposts or taxes (except income tax) with respect to the mining operations. Alluvial gold mining is exempt from any impost or tax and a gold miner's income tax is fixed at 8 per cent. Mining enterprises enjoy preferential treatment in respect of certain import duties, transport rates, etc.

Manitoba (Canada). There is a tax on mining claims and a royalty tax in respect of minerals and mineral products. The former is fixed at \$5 a year during the term of the original lease and at \$10 a year for each subsequent renewal. A mining claim held under patent pays \$5 a year. The royalty tax is fixed at 8 per cent per annum of the income derived from the operation of the mine, in excess of \$10,000. Lower rates apply over the first three years.

Mexico. In Mexico there is a tax on mineral exploitation concessions and a tax on production. Patented metallic mineral concessions are taxed at 15 pesos annually per claim, while non-metallic mineral concessions are taxed at 8 pesos annually per claim. Specific production tax percentages are prescribed for 18 different minerals and the percentage for each mineral also varies, in most cases, with its ore or refined state. For example, the production tax on gold is : refined, 19.7 per cent ; unrefined bars, Doré and precipitates, 20 per cent ; concentrates 20.3 per cent ; ore 20.6 per cent. Certain exemptions and reductions are applied to this general rule regarding production tax.

Pakistan. In addition to certificate and licence fees, a licensee or lessee is required to pay a royalty at rates varying with the mineral and based on pit-head values. These are : precious stones 18½ per cent (for mining leases only) ; coal 10 per cent ; mica, limestone, gypsum and silica sand, and fireclay 5 per cent ; gold and silver 5 per cent (of market value) ; all other minerals 5 per cent. Certain minima are fixed. Dead rent is also charged, but no lessee pays both royalty and dead rent in respect of the same lease, but only the greater of the two.

Peru. Exploration rights cost sole 0.50 per annum per ha. Annual ground rent per ha. on concessions is payable as follows : soles 1.50 for gold ; soles 20.00 for all other metals and soles 7.50 for coal and other non-metals. The concessionaire of treatment plants and of general tunnels is required to pay soles 100.00 per year per ha. Extra ground rent is payable, when, after the fifth year, expenditure on a concession does not reach a certain figure, but any accumulated extra ground rents may be deducted from the first profits tax to be paid.

Payment of ground rent and profits tax (not detailed in the survey), exonerates the concessionaire during the 25 years from the promulgation of the mining code from all other charges or taxes, as well as from any other tributary contribution on the concession or its products.

Certain deductions are allowed in the determination of profits tax and a concessionaire may apply to the Executive Power for participation by the state in the profits of the exploitation as a substitute for the profits tax. The participation is fixed by common consent at between 10 and 20 per cent.

The Commonwealth's Mica

THE Commonwealth plays an outstanding role in the world position with regard to supplies of high-grade mica, for it is singularly well endowed with deposits of this vital industrial and strategic mineral.

The importance of the muscovite and phlogopite varieties of mica arises from its utilization in the electronic and electrical industries, and whilst it is untrue to say that modern industry would be impossible without mica, it is quite certain that industry today, which is directly or indirectly so dependent upon electrical plant, equipment and control instruments, would have developed along very different lines had this mineral not been available.

The properties of mica upon which its usefulness rests include : its perfect cleavage, flexibility, chemical and physical stability, transparency, high dielectric strength and low power-factor (loss). Because of this combination of properties, mica is a very efficient electrical insulator even when split into very thin sheets, and it is this fact that makes it unrivalled among materials both natural and synthetic, organic or inorganic, for the applications to which it is put. This is so very markedly the case that it has been said that the best substitute for high-grade mica is low-grade mica; indeed, Germany used the latter during the war.

Mica is a commodity of vital importance in all industrial countries both for civilian and military purposes. Many of the major industrial nations, however, are completely or almost completely deficient in domestic resources of high-grade mica whilst the major mica-producing countries, on the other hand, have comparatively little internal consumption of the mineral. There is, therefore, a large international trade in mica and a lively interest in maintaining stocks at high and even "strategic" levels by government agencies, especially as the properties of synthetic mica, as presently produced, are not as good as those of the natural material and indeed rule it out for some important uses.

In addition to the uses arising out of its electrical properties, sheet muscovite is, or has been, employed because of its strength, flexibility, transparency or heat-resisting properties. Scrap and flake mica, obtained either as a by-product from the working and preparation of sheet mica, from the working and washing of other minerals like clay, or by working deposits that yield only flake mica, are quite widely-used commodities but they are of vastly less importance than sheet or electrical grades of mica.

Statistics of quantity alone, without reference to quality, mean very little where mica is concerned. In the table, for example, the United States appears to be the world's largest producer of mica, when actually it is as deficient in sheet mica as most of the other large industrial countries. This arises from the fact that the preponderance of output, amounting to about 75 per cent, is of scrap or waste grade.

By contrast at the other end of the scale, Australia, Northern Rhodesia, Southern Rhodesia, Tanganyika, South

This article, by E. R. Varley, is published by courtesy of "New Commonwealth" and has been abridged.



Above: Women mica splitters at a mica mine in Andhra State, India

At right: Removing a "book" of mica at a mine in the Miami area of Southern Rhodesia

Photograph by courtesy of The Federal Information Department, Southern Rhodesia



Africa and Canada, are all quite small producers statistically, but their output is largely of very high quality mica.

India alone of all the mica producers is a country where the output is both very large in quantity and of very high-grade quality. Indeed, Indian output and exports, and hence quality and prices, tend to have a dominating effect on the world's mica market.

It follows that the main pattern in marketing mica consists of production primarily in the Commonwealth for supply to the United States, to the United Kingdom and the rest of the Commonwealth, and to the other major industrial countries of the Free World. The U.K. has no resources of high-grade mica that normally are economically workable.

Details of the mica situation in the U.S.S.R., China, etc., are not disclosed, but it is believed that between the wars domestic output was increased to such an extent that by 1939 Russia was virtually self-sufficient in the mineral.

One of the main problems facing some of the smaller Commonwealth and other producers is that of the exhaustion of the deposits, the amount existing being, of course, limited by natural causes. Another major difficulty is that of locating the mica when it does exist beneath the earth's surface. Indeed, of all the minerals and ores used in

industry, mica and quartz crystals are among the most difficult to find even with modern scientific aids to prospecting. This is because mica occurs, not in regular deposits, but haphazardly. Even in the right sort of rocks, the pegmatites, difficult to mine or quarry, there may be long barren stretches with no return for the cost of the excavating work. Moreover, mechanical methods of dressing and sorting are not applicable to block mica.

The eventual exhaustion of the deposits now known and the increasing possibilities of synthetic mica entering the market in substantial quantities, however, and the increasing use of substitute materials or of alternative techniques avoiding the use of mica, are bound to bring new problems to the producers in the more distant future.

Nevertheless, it is likely that demand for good-quality electrical mica will continue for some time to come, and Commonwealth producers are well placed to take advantage of it.

WORLD PRODUCTION OF MICA (1,000 tons)

Commonwealth Countries

	1954	1955	1956
Northern Rhodesia—			
Sheet	3	2	3
Southern Rhodesia—			
Block and sheet	82	63	55
Crude and waste	—	—	—
Tanganyika—			
Block and sheet	60	66	62
Union of South Africa—			
Sheet	2	5 (10 cwt.)	
Waste	1,834	3,490	2,249
Canada (sales)—			
Rough mine-run or rifted	5	11	18
Trimmed	8	11	10
Splittings	1	—	1
Sold for mechanical split-			
tings	18	4	7
Ground	418	421	667
Scrap	307	286	40
India (exports)—			
Block	1,612	2,187	5,507
Splittings	4,852	7,468	6,546
Ground and scrap	10,275	12,133	12,180
Australia—			
Block	38	25	13
Scrap	36	9	—

Foreign Countries

	1954	1955	1956
France	152	137	*
Norway (incl. waste)	1,800	1,829	1,083
Spain	8	9	12
Sweden (sales)—			
Block	—	—	—
Ground	148	164	175
Angola—			
Sheet	11	15	24
Waste and splittings	161	230	432
Madagascar—			
Phlogopite (block)	516	266	530
Mozambique	1	13	12
Mexico (exports)	—	—	27
United States (sales)—			
Sheet (uncut)	296	286	396
Scrap†	72,387	85,207	77,062
Argentina—			
Sheet	236	44	138
Waste	—	62	50
Brazil	1,769	1,362	1,306
World total‡	97,300	116,000	110,000

* Information not available.

† Including mica recovered from kaolin and mica schists.

‡ Excluding mica produced in Kenya, Uganda, Ceylon, Austria, France, Spain, Morocco, Uruguay, Formosa, Roumania, U.S.S.R., and China.

Source: Statistical Summary of the Mineral Industry, 1951-1956 (Mineral Resources Division, Overseas Geological Survey).

CANADIAN ROUND-UP

[From Our Own Correspondent]

DURING the past several months there has been a definite slowdown in mining in Canada, due, of course, to the slump in metal prices. Coming on the heels of a prolonged boom which saw many new large discoveries brought along to the production stage, the tendency was to view recent trends with pessimism, perhaps more than the actual situation warranted.

As the summer exploration and development programmes of 1958 reach a point where analysis is possible, there is a growing feeling amongst mining men that perhaps the end has not been reached—that there will be further periods of progress and achievement based on encouraging ore discoveries which appear to guarantee Canada's reputation as a vast storehouse of minerals for many decades to come.

New Tide of Optimism

A year ago there was an uneasy feeling that the high prices and unprecedented production levels could not be maintained for much longer. This attitude was proved correct. Companies such as Alcan, Inco, Cominco, and Hudson Bay Mining and Smelting announced production cutbacks. The long-established Britannia mine in British Columbia caused a stir when it announced that, due to low copper prices, it was shutting down after more than fifty years' continuous production. This action was the forerunner of other shut-downs across the land, although the blow was softened somewhat by new uranium and asbestos production. At the end of July, Western Nickel Mines Ltd., in which British Columbians took great pride, since it is the only nickel mine in the province, announced closure due to cancellation of contracts, and from one end of the country to the other closures were impending, production plans were curtailed or cancelled, or cutbacks of one kind or another were announced.

Yet in the face of all this bad news, there is a new rising tide of optimism.

Mattagami and Craigmont

Perhaps the first indication that energy still persisted in the Canadian mining industry came in May, when several big guns of the mining world joined forces with what is known as the Mattagami Syndicate to explore the possibilities of a major zinc find in north-western Quebec.

The major companies were Noranda, McIntyre Porcupine, and Canadian Exploration, probably the most powerful combination of Canadian mining companies ever formed. Their intention to develop the Mattagami area came at a time when zinc was in its most depressed state for many years, and thus was taken by Canadians as a firm bet on the country's future.

The Mattagami area is 110 miles north of Val d'Or and at present cannot be reached by road or rail, supplies and men being flown in at the present time. Thirty claims are covered by the syndicate and indicate 14,000,000 tons of ore running 11.5 per cent zinc, 0.65 per cent copper, 0.016 oz. gold and 1.1 oz. silver per ton. This estimate came after the drilling of 37 holes.

No sooner was this action fully realized when market action in New Hosco, which has claims straddling the Allard River west of the Mattagami Syndicate ground, focused attention also on the copper-producing potentiality of what now appears will be a major mining area of the future. After New Hosco had jumped spectacularly from 18 c. to \$7.25, results emerging from the area showed that a high-grade copper mine is in the making. The No. 1 hole returned a core length of 77 ft., averaging 4.01 per cent copper. The No. 2 hole averaged 2.32 per cent over 171 ft., with a 52 ft. length of 3.7 per cent zinc. Subsequent holes continued to suggest good widths, lengths and grades of copper, and future work is looked forward to with the anticipation that here is a big mine of the future.

Meanwhile, 3,000 miles west, in British Columbia, a team consisting of Noranda, Canadian Exploration, and Peerless Oil and Gas, is pushing an intensive development programme aimed at bringing the Craigmont Mines Ltd. property to production. Coupled with this plan is an unofficial opinion that, together with the copper-producing potentialities of the adjoining Highland Valley, a copper smelter for British Columbia is a possibility within the next few years. The last copper smelter was operated by the Granby Consolidated Mining, Smelting and Power Company, at Anyox, B.C.

So far some 8,100,000 tons of ore, averaging 1.99 per cent copper and 21.7 per cent iron, have been outlined at the Craigmont property. Nearby, the Bethlehem Copper Corporation is pushing its underground development programme, aimed at proving the vast tonnages of copper ore indicated by diamond drilling. So far grade is only about 0.8 per cent, but with upwards of 80,000,000 tons indicated, the Bethlehem management feels that a commercial enterprise will be possible, particularly if the price of copper continues its current upswing.

Iron, too, is occupying the current spotlight in Canada. Producers are feeling more optimistic, too, with a pick-up in sales in recent weeks and a generally cheerful tone pervading this section of the industry.

In a 4,000 sq. mile section of north-western Ontario, a search for minerals is being carried out by a syndicate formed by J. H. Hirshorn, financial backer of the famous Blind River field, and associates. It has already resulted in the discovery of two beneficiating-type iron deposits and holds promise of the discovery of copper and nickel finds.

The area, all unexplored bushland, is about 160 miles north of Lake Superior and parallels the C.N.R. line between Armstrong and Nakina. So far the search has found (1) two iron deposits, (2) two hundred anomalies found by geological-geophysical air work, (3) staking of all promising areas and close investigation of fifty of the anomalies. A total of 1,309 claims has been staked.

In general at the end of July, emphasis in Canada is on the search for new metals and minerals. Producers are carrying on as best they can under the circumstances, and will be in a position to expand or resume operations at a moment's notice when the market warrants.

Notes from the Provinces

British Columbia: Indicating a stepped-up interest in exploration for iron ore on Canada's west coast and a more confident atmosphere amongst mining men in general, was the declaration by Mr. Justice Sullivan that the B.C. Mineral Properties Taxation Act, passed by the provincial legislature in 1957, was *ultra vires*. The Act, contained in the widely discussed Bill 87, was in effect a blow at the development of iron ore for export, and was passed ostensibly to preserve for future steel operations all ore reserves in British Columbia.

British Columbia's only uranium property, Rexspar Uranium and Metals Mining Ltd., near Kamloops, is proceeding with construction of a 750-ton mill. Some difficulty has been encountered in financing, but the property is expected to be in production next year.

Ontario: More efficient production methods and improvement in ore grade, with development at depth, are indications of new interest in the Red Lake area, where gold producers have been having a hard time in recent years. Mines like Campbell, Madsen, and Cochenour Wilans will all turn out more gold this year than ever before, and in spite of the fixed price for gold and continuing inflation, five other properties in the district are slated for underground investigation. Conditions in the Red Lake, slightly depressed since the war, are announced as never looking better.

One of Ontario's newest mining areas, the Manitouwadge, with two mines, Geco and Willroy, is riding the current market depression well. Geco is milling 3,500 tons daily, has just milled its one millionth ton of ore, and is looking to rising copper prices to step up the milling rate to 5,000 tons.

Its neighbour, Willroy, a zinc-copper producer, is also doing well, and recently raised the mill rate from 800 tons to 1,000 tons daily, following receipt of a contract with Belgian sources for 12,000 tons of zinc.

At Steep Rock, where severe curtailment in iron production was in effect, a sales pick-up has had the effect of increasing the production rate by 50 per cent in recent weeks. The company's outlook is considered promising by the management, which has stated that it feels the current recession is almost over.

The Caland project, adjoining Steep Rock, is also moving ahead with confidence in its undertaking to dredge Steep Rock Lake and bring the underlying iron ore deposits to production by 1960.

Quebec: In Quebec, emphasis this year has been on exploration, although Lake Asbestos, of Quebec, and two other asbestos properties have been brought into operation. However, the asbestos business is more competitive than a year ago and the industry is worried about the effects of Russian competition.

The Chibougamau area is continuing to attract attention, and there are twenty or thirty companies pushing major exploration programmes in this rich copper area.

In the Eastern Townships of Quebec, Cyprus Exploration Corp. has announced a promising new copper deposit.

Machinery and Equipment

Painting Mine Darkness With Light

All those interested in either taking, obtaining, or seeing illustrations of scenes in mines will agree that the wider application of the unorthodox technique used to take the picture published at the bottom of this page should rebound to the benefit of all those engaged in mining and tunnelling.

The problem under discussion was how to take a picture of a twelve-man team using the Swedish method of drilling to excavate a mile-long tunnel at Avisio in Italy. The situation was complicated by the fact that, for technical reasons, electric floodlights or normal flash equipment could not be used.

The photographer solved this dilemma by the unorthodox technique of using a long exposure and then picking out the individual details of the picture with a torch beam.

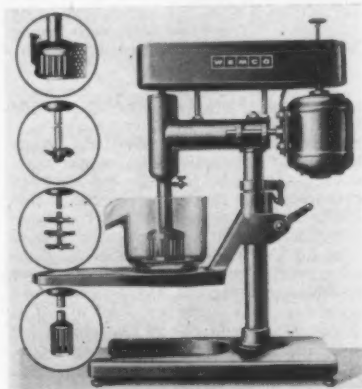
Standing beside the camera, with his back pressed against the working face between the drill steels at a distance of 8½ ft. from the drill crew, he gave a 7-min. time exposure. During this time he played the beam of a 40-watt torch on the men and across the tunnel wall. Each man in the team had to remain absolutely still for 25 sec. until the light was moved to the next subject. In this way it was possible to emphasize certain details of the picture whilst leaving heavy contrasting shadows to lend added effect.

NEW FLOTATION MACHINE

The Mineral Master, a Fagergren batch type flotation machine utilizing easily interchangeable parts to perform laboratory test work in flotation, agitation, and attrition, has been announced by Western Machinery Co. The Mineral Master is a completely modernized and redesigned version of the Wemco Fager-

gren laboratory flotation machine. It performs the functions of three ordinary laboratory test machines with a resulting saving in space and expense.

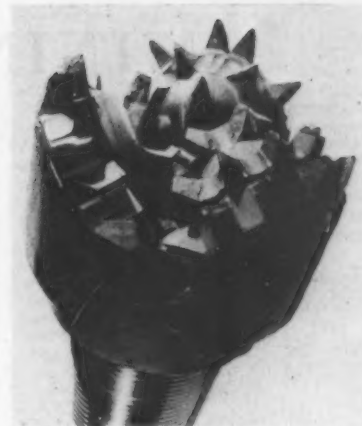
In addition to the versatility made possible by the easily interchangeable components, many other changes have been incorporated in the new machine. All major castings are now made of aluminium. The platform supporting the tanks can be easily adjusted to remove the tanks for cleaning. The stainless steel impellers are specially designed for easy cleaning. The machine is now easily dis-



Above, at right, boring tool by Security Rock Bits Co. Ltd.

Centre, the Wemco flotation machine

Below, drilling in the Avisio tunnel, photographed by the new technique described



assembled into five major components for greater portability.

In addition to the two styles of variable pitch sheave drives which were available in the past, the Mineral Master can be equipped with a step cone sheave drive. The air inlet has also been redesigned to facilitate the introduction of gases other than air into the bowl.

WELDING PROCESSES IN ROCK BIT MANUFACTURE

At their plant in Manchester, Security Rock Bits Co. Ltd. manufacture three-cone rock bits which are capable of drilling holes with diameters of between 5½ to 12½ in. The cutters and arms are made from nickel-alloy steel forgings.

To help withstand the severe abrasion during drilling, the teeth of each cone are faced with tungsten carbide, deposited by means of oxy-acetylene welding torches. Part of the arm segment of the rock bit also has to be coated with wear-resistant material to a depth of approximately ¼ in. After welding, the surface is circular ground, and must be free from any gas holes or cracks. After the cones and bearings are assembled on their respective arms, the three segments are clamped together and located by means of dowel pins. Down the outside of each of the three seams is a deep weld groove approximately ¼ in. wide and ½ in. deep, and the seams also extend across the top of the assembly under the cutters. After tack welding, the clamps are removed and the bit head is placed in a fixture which allows both vertical adjustment and rotary movement.

HYDRAULIC MULTI-HANDLING EQUIPMENT

A new type of multi-bucket handling equipment for bulk loads—the Bennes Marrel hydraulically operated haulage system fitted to wheeled vehicles of various sizes—is now being produced in this country by the sole concessionaires, Aero Maintenance Equipment Ltd. Orders worth £70,000 have been announced.

Unique inasmuch as it makes use of a number of skips, buckets, or tanks which are completely divorced from the truck chassis, loads of from 5 to 50 tons can be lifted at a time, the whole operation taking from 15 sec. according to load. The equipment can be installed on any vehicle of suitable capacity.

MINING MISCELLANY

Under the Colombo Plan, India is to import between \$9,500,000 and \$10,000,000 worth of Canadian copper, aluminium, and nickel this year. Imports last year amounted to \$11,000,000 of these metals alone.

In January-June, 1958, Malaya produced 10,054 troy oz. of raw gold compared with 3,831 troy oz. in the first half of 1957. The following are production figures for other minerals in January-June, 1958 (in tons) with the January-June, 1957, figures in brackets: Coal, 39,695 (91,997); iron ore, 1,129,155 (1,502,680); bauxite, 114,983 (149,468); ilmenite (exports), 44,946 (54,042); monazite (exports), 308 (255); wolfram, 25 (17); scheelite, 8 (11); columbite, 99 (79).

Ninety-four fresh deposits of iron, manganese, copper, and gold have been discovered in Mexico in the region of Minatitlan, Colima.

Arrangements are being made to exploit large quantities of magnesite found in the hills of Uttar Pradesh, India. Large deposits of sulphur have also been found, and it is believed that uranium is available in the region.

Due to lack of demand, the plant producing nickel-bearing iron ore at the Larymna Mine in central Greece has been closed down.

There are 40,000,000 tons of kaolin in Ceylon, according to a recent estimate, with rich deposits in the Boralasgamuwa region, about ten miles from Colombo.

A new edition of the British Standard for flexible cable for miners' cap lamps, originally published in 1940, retains the essential points of the original standard, and introduces test requirements for the various components of the cable.

The Dutch ship *Reliable* has left Liverpool for County Wicklow, Eire, where she is due to load 520 tons of pyrites from the Saint Patrick Mining Co. at Avoca.

A second washing mill is being built by the Sierra Leone Development Co. at Marampa, West Africa, to deal with the increased mining of powdered ore. It is expected that on completion of the second mill, exports of iron ore will rise to 1,500,000 tons per year.

The Anaconda Co. has begun sinking the first of several shafts to obtain clay samples to be tested for aluminium content in Latah County, Idaho, United States.

A German group has signed an agreement with the Liberian Government for an iron ore concession. The concession may be in the Voinjama or Putu area, but exact details are not known.

In a volume published recently by John H. Dunning, Lecturer in Economics, University of Southampton, entitled "American Investment in British Manufacturing Industry", it is stated that the North British Rubber Co. can claim

the distinction of being the first American company to start manufacturing in Great Britain.

Since the construction of a new deep-water berth two years ago, iron ore imports handled at the British Transport Commission port at Hartlepool have leapt from 130,000 tons to 600,000 tons per annum, and are expected to continue to rise to 1,000,000 tons. This increase has been made possible to a large degree by mechanized grab feeding in clearing holds. Using earth moving equipment on British made International crawler tractors with only very minor modifications, it is possible to speed up the turn around of 7,000 to 11,000 ton cargo vessels by as much as sixteen to twenty-four hours. The equipment is illustrated opposite.

Due to the exhaustion of the main coal resources, closure of the 90-year-old West Cannock No. 1 Colliery, which was foreshadowed by the West Midlands Divisional Coal Board some months ago, is to take place towards the end of September. The remaining reserves available to the pit consist of small sections of coal which can be more easily worked from Littleton Colliery. There has been full consultation between the board and the National Union of Mineworkers.

Coal deposits in the El Cerrejon area, in north-eastern Colombia, are estimated at not less than 212,000,000 tonnes by the Instituto de Fomento Industrial, the semi-official Colombian Industrial Development Institute. There are reported to be many more millions of tonnes of coal in areas not yet fully explored. Some of the coal deposits are suitable for open-cast mining. Conditions for exploiting the deposits and for tax concessions have been laid down by the Colombian authorities. So far, several U.S. companies, a British, a French, and a German concern are reported to be interested in the deposits, but no contract proposals have yet been submitted.

At a session of the Spanish Parliament recently, a Bill was approved for the exploitation of radioactive mineral deposits, and for the collaboration of private enterprise with the Nuclear Energy Board in reaching the target figure for mined radioactive minerals of 1,800,000 tonnes annually by 1970.

Algoma Ore Properties of Canada, owned by Algoma Steel, closed its Helen Mine on August 3, to enable demand to catch up with ore reserves.

In Yugoslavia, a new lead-zinc mine was opened in Kiznica, in the Kosovo-Metohija Region, at the end of June. The second largest mine in Yugoslavia, it has started production a year and a half ahead of the scheduled date. The mine will be producing 200 tons of high-grade ore daily to start with, and by next spring its capacity will be raised to 500 tons daily, or 150,000 tons annually.

Liberalization of a section of the Mining Act has stimulated large capital interests in Western Australia. Reynolds Pacific Mining has been granted 4,800 sq.

miles to prospect for bauxite near Wyndham. Rio Tinto has a concession of 13,000 sq. miles at Southern Cross to prospect for minerals other than gold or iron. Union Carbide Corporation, of U.S.A., has options near Port Hedland with manganese as the objective. Western Mining Corporation has 2,000 sq. miles near Derby for copper, 6,250 sq. miles for bauxite in the Darling Ranges, and 625 sq. miles near Collie for coal.

A new mining bibliography has been the result of a meeting in Geneva of experts on coal production, which took place in March, 1957. It is published by the United Nations, for whom it was prepared by the Economic Commission for Europe, and is entitled *Exchange of Bibliographical References on Coal Production Methods*.

Construction will begin next year on a \$1,000,000 laboratory-office structure at University Park, Monroeville, near Pittsburgh, Pennsylvania, U.S. This is the site chosen for the development of a campus-type research centre to serve the United States bituminous coal industry.

Drilling of a second deep test well in Libya has been begun by D'Arcy Exploration Co. (Africa) Ltd., one of the British Petroleum prospecting subsidiaries. The company's first deep test well, Castel Benito No. 1, thirty miles south of Tripoli, was abandoned last month at 3,500 ft.

The first consignment of iron ore from the Mindale Mine, fifteen miles from Blantyre, Nyasaland, was due to be railed to Beira on its way to Germany at the end of last month. The mine began open-cast operations in March, and this first consignment of ore amounts to 6,500 tons. The ore is of exceptionally high quality, containing about 68 per cent iron.

Although the government contract for the survey of Thailand's iron ore deposits ended on July 15, the German experts from the Krupp organization will be continuing the survey at the expense of their company. This is because two fields still remain to be surveyed.

The Electro Metallurgical Co., a division of the Union Carbide Corporation, is producing a new high-carbon ferrochrome with which economical chromium additions for both steel and cast iron can be made.

At its Iron Mountain property, nine miles north-west of Redding, California, the Mountain Copper Co. of California has replaced underground pyrite mining with a newly-developed open pit.

After a month's close-down caused by low metal prices and oversupplies of ore, Miami Copper Co. and its two subsidiaries, Copper Cities Mining and Castle Dome Mining, resumed copper production this week at their three mines in the Miami, U.S., area.

Mr. J. M. Greenfield, Minister of Education, is to open the headquarters and Kitwe Centre of the Copperbelt

Technical Foundation in Northern Rhodesia on August 22. The Foundation, in existence for two years, was made possible by a donation of £400,000 from the four main N.R. copper companies.

A further stage in the expansion programme of Mount Isa Mines Ltd. was reached when the new winder, the largest in Australia, recently commenced work. The winder is 4,500 h.p. and is electrically driven. Alternating current is received at 11,000 v. 3 phase 50 cycles, and is converted to d.c. by a twin generator flywheel. The grooved drums are 16 ft. dia., with a capacity of 4,000 ft. of 1½ in. dia. locked coil rope with a breaking strain of 172 tons. At present, the winder will operate to the 2,400 ft. level, but is capable of hoisting from a depth of 4,000 ft. Shaft speed is 2,650 ft. per min., and the capacity of the winder is 180,000 tons of ore per month, using 12-ton capacity skips. Completion of the copper refinery at Townsville is expected in 1959, but it does not seem that much progress has been made in the very important factor of the reconstruction of the Townsville-Mount Isa railway, to put it into a condition to deal with the great increase in traffic that will result from the expansion of Mount Isa's operations. This link is regarded as vital to the full development of the project. Yet, later news is that the Australian Government is sending a detailed application for a £A30,000,000 loan to modernize the Mount Isa-Townsville Railway to the World Bank. The recent Bank Mission to Australia was greatly impressed by the potentialities of Mary Kathleen and the efficiency of Mount Isa.

PERSONAL

Dr. J. H. Watson, C.B.E., M.C., Ph.D., A.R.S.M., has been elected president of the Institution of Mining and Metallurgy for the session 1959-60 in succession to Mr. J. B. Dennison. Dr. Watson was awarded the M.B.E. in 1945, and the C.B.E. in 1957. He will take office in May next year.

Mr. R. C. Gebhardt has been appointed manager of the Mining Division of the E. J. Longyear Co.

Mr. J. Anderton, O.B.E., is to join Mr. W. Smith as deputy chairman of the Scottish Divisional Board of the National Coal Board. Mr. R. A. Moore, O.B.E., now divisional production director, has been appointed divisional reconstruction director in the place of Mr. H. R. King. Mr. Moore's place as production director will be taken by Mr. D. J. Skidmore.

Mr. R. G. C. Cowe, staff director, North-Eastern Division, National Coal Board, has been appointed a deputy secretary. Mr. D. F. Pexton has been appointed marketing director, S.W. Division, in succession to Mr. E. J. Davies.

CONFERENCES AND EXHIBITIONS

The award of a \$1,615,213 base contract for the construction of a new research laboratory for the Bureau of Mines at Fort Snelling, Minnesota, U.S., has been made to Maurice Mandel Inc.

The Association of African Geological Surveys held its biennial meeting in Leopoldville, Belgian Congo, recently, under the chairmanship of Dr. F. Dixey, Director of the Directorate of Overseas

Geological Surveys in London. Seventy delegates represented twenty-one official Geological Surveys, as well as fourteen geological surveys belonging to the leading private companies in Africa. New geological maps of Africa were presented in draft form at the Congress, and the programme included a symposium on uranium in Africa.

General meetings of the Institution of Mining and Metallurgy in the session 1958-59 will be held at the Geological Society of London on the following dates: October 16, 1958; November 20, 1958; December 18, 1958; January 15, 1959; February 19, 1959; March 19, 1959; April 16, 1959; May 21, 1959 (A.G.M.).

The Eighth Annual Drilling and Blasting Symposium, held jointly by the Colorado School of Mines, the Pennsylvania State University, and the University of Minnesota, will take place from October 2 to October 4, 1958, at the University of Minnesota, U.S.

COMPANY EVENTS

The new address of Mr. W. Alexander, north-eastern area supervisor of Ruston-Bucyrus Ltd., of Lincoln, is 75 Oakdale, Harrogate, Yorkshire.

A joint company is to be formed by J. Brockhouse and Co. Ltd. in conjunction with W. G. Allen and Sons (Tipton) Ltd., to be known as Brockhouse Allen Ltd. The new company will operate in the Federation of Rhodesia and Nyasaland in factories they will acquire from J. Brockhouse (Rhodesia) Ltd. in Ndola and Luanshya, and will produce engineering requirements for the mining and transport industries.

The London office of Holman Bros. Ltd., at 44 Brook Street, W.1, has now become also the London office of Climax

Rock Drill and Engineering Ltd., who have moved from 4 Broad Street Place, E.C.2. The Holman office in Scotland, formerly at Elmbank Street, Glasgow, and the Climax office, at Cathedral Street, Glasgow, have both been transferred to 20-26 Ashton Lane, Glasgow, W.2.

Obituary

VISCOUNT BRACKEN

Lord Bracken, who died in London last week at the age of 57, achieved world-wide renown during the war as Minister of Information, when the name of Brendan Bracken became a household word. Less widely known, perhaps, but scarcely less outstanding, has been the impact of his powerful personality on the many other fields with which he became associated during a singularly rich and varied career, embracing politics, mining, journalism, and numerous forms of public service.

Lord Bracken's association with financial journalism dates from the inauguration of *The Banker* in 1926 with a capital of £100. From this stemmed the formation of a company, two years later, to acquire *The Financial News*, *The Investors' Chronicle*, and *The Banker*. A half-interest in *The Economist* was also purchased, the other half being acquired by a group headed by Sir Henry Strakosch, chairman of Union Corporation. After the war, *The Financial News* purchased *The Financial Times*, in which it merged its own identity, and under the chairmanship of Lord Bracken the group of papers was further expanded. Arising from association with Sir Henry Strakosch, Lord Bracken was invited, in 1940, to join the board of Union Corporation, and in 1945 he was elected chairman of the company, a position he held until his death. He visited South Africa frequently, and was a sound judge of mining affairs.

An International Drott 4-in-1 back dragging ore to the square of a ship's hold



Metals and Minerals

Magnesium In The Nuclear Industry

For many years magnesium had few industrial applications, being used mainly in pyrotechnics, as a flashlight powder for photography, and to a minor extent in deoxidizing and desulphurizing other metals and alloys. Its development as a structural material came about largely to meet the needs of the aircraft industry for high-strength light alloys. The use of this metal in structural components made very rapid progress during the war and so led to considerable expansion in the production of magnesium metal.

Now magnesium is finding an outlet in nuclear engineering, primarily because of its low neutron absorption cross-section and excellent compatibility with uranium, which attracted attention to this versatile metal as a potential canning material. When subjected to high temperatures uranium swells and bows irregularly, and this caused difficult technical problems. In canning uranium for gas-cooled reactors it is essential that the containing can should be capable of following the contours of the uranium without failing to sheathe it. At the same time, the canning material must be capable of retaining the various technical properties required of it. Furthermore, its service life must be comparatively long, since it is desirable that the changing of fuel elements should be as infrequent as possible and that the risk of any single element failing should be eliminated to the fullest possible extent.

Over a considerable period, various metals have been tried as canning materials, experimental work being concentrated on mechanical properties at temperatures of 200 deg. C. and higher. Eventually, combined research by A.E.R.E., Harwell, and Magnesium Elektron Ltd., Manchester, led to the development of the Magnox series of magnesium alloys. Magnox A-12, for which a patent has been taken out, contains about 2 per cent aluminium with a small addition of beryllium. It is readily fabricated and has been supplied in extruded, forged, and rolled strip forms. This material was selected for the canning of all fuel elements in the Calder Hall gas-cooled reactor. When the cans were examined after a run of ten months, it was found that only 10 out of 10,000 had failed.

Higher temperatures increase the efficiency and economy with which gas-cooled reactors can be operated. Available evidence suggests that magnesium alloys developed for canning are capable of withstanding conditions in reactors operating at outlet gas temperatures in excess of the current proposed maximum of 400 deg. C. Improvements in mechanical properties, notably ductility at 200-300 deg. C. and creep strength at 400-500 deg. C., may still be possible, while compatibility with carbon dioxide is unlikely to prove a limiting factor at temperatures significantly below 500 deg. C.

The design of British gas-cooled reactors using natural uranium has been so greatly improved as a result of continuous research and operating experience that their potential output has been multiplied many times for only small in-

creases in capital cost. Since this type of reactor has proved capable of reliable and economic operation on a commercial scale, it is likely to be widely adopted, both in the United Kingdom and elsewhere. Having regard to the satisfactory results achieved with the Magnox cans, an expanding market for magnesium in the nuclear industry appears to be assured.

The Atomic Energy Authority is reported to be showing considerable interest in the possibility of using zirconium-containing magnesium alloys on account of their resistance to grain growth.

MARKETS FOR NICKEL

In a letter to shareholders accompanying the interim report, Dr. John F. Thompson, chairman of International Nickel, states that the company is intensifying its marketing activities with the aim of increasing nickel applications. The letter points out that today's uses of nickel represent a consolidation of applications which have withstood continued pressures from competitive materials and substitution programmes. It is significant therefore, that there are at present more than 3,000 nickel-containing alloys in widely diversified commercial use.

Although nickel and nickel-containing alloys have been replaced by alternative materials in some applications, new or expanded uses for the metal will more than offset its loss in these fields. For example, stainless steels will continue their outstanding growth. Nickel alloy steels will more than hold their own in such heavy equipment as trucks, tractors, and industrial machinery of all kinds, because truly satisfactory substitutes have not been developed. An important increase is expected in electroplating. The special alloys for electronics, instrumentation and automation will enjoy wider fields as technology advances. The field of heat offers great promise for nickel, an example being the projected gas turbine for motor-cars and trucks.

ALUMINIUM IN AFRICA

A number of important developments have recently been reported in Africa's aluminium projects. The French aluminium producer Pechiney has announced the signature of a number of agreements relating to the financing of the alumina plant which the Fria company is building in French Guinea. Fria is the largest of the undertakings formed on an international basis for the development of Africa's resources. The companies involved in the project, besides the French producers Pechiney and Ugine, are Olin Mathieson, Aluminium Industrie Aktiengesellschaft, of Switzerland, and the British Aluminium Co.

The Guinea plant is due to start operations in 1960 with a yearly capacity of 480,000 tonnes of alumina with the possibility of later expansion to over 1,000,000

tonnes. Total investments are placed at 56,000,000,000 French francs of which 15,000,000,000 have already been spent. This amount is being provided as follows: by contributions to Fria's equity capital by the various interested companies; by loans from the Caisse Centrale de la France d'Outre Mer, made mainly to the subsidiary companies Transfria and Sifria, who are responsible for the building of a connecting railway to the port of Conakry and for the construction of a township; and by very large long-term private financing, which includes a \$40,000,000 loan by two American insurance companies, a long-term investment by the interested British and Swiss companies, and a French loan contribution for which the Crédit Lyonnais and the Crédit Commercial de France will be responsible. Lazard Frères in Paris, New York, and London, who helped to negotiate these agreements, have been given "various permanent functions and responsibilities" to safeguard the interests and equality of treatment of all the lenders.

Olin has said that it is negotiating with the International Co-operation Administration for a United States Government guarantee covering both its equity contribution to the projects and the funds borrowed from United States institutional investors.

Pechiney has also reached an agreement with Aluminio Portugues (Angola) S.A.R.L. to construct a 50,000 tonnes per year aluminium plant in the Portuguese African territory of Angola. Pechiney will act as consulting engineers, and have acquired a capital participation in the new project. The plant will start producing at a rate of 25,000 tonnes a year. A hydroelectric station at Cambambe, sited on the middle Cuanza, will produce an estimated 1,420,000,000 kWh. annually, of which the aluminium plant will absorb 920,000,000 when operating at capacity.

Compagnie Belge pour l'Industrie de l'Aluminium (COBEAL), set up about a year ago with a capital of 260,000,000 Belgian frs., has now founded an affiliate in the Congo called Cobecal Congo. The new concern has a capital of 10,000,000 Congo frs.

Dr. Nkrumah has stated that Kaiser is sending experts to Ghana soon to make an up-to-date survey of the Volta River project. The object of the survey is to get the power project started; aluminium production could then follow. Dr. Nkrumah stressed that the United States Government would share the cost of the latest survey with Ghana.

★

The United States aluminium industry has pressed its plea for import curbs on the metal in the light of offerings by Communist countries. The industry's representatives have conferred with United States Government officials on a programme which would include international agreements to channel surplus aluminium to less developed areas of the world.

COPPER · TIN · LEAD · ZINC

(From Our London Metal Exchange Correspondent)

Although markets have undergone little change since our last report, increasing doubts as to whether the U.S. Minerals Stabilization Bill will obtain House of Representatives' approval this session has introduced a note of caution. There is certainly a growing realization that the future prices for copper, lead and zinc are bound up with the early coming into force of the proposals embodied in the Bill.

BACKGROUND TO COPPER'S BEHAVIOUR

Towards the end of last week, and only five days after raising their price $\frac{1}{2}$ c. to 27 c., customs smelters were once again quoting copper at 26 $\frac{1}{2}$ c. having found a distinct easing off in sales at the higher level. Both producers and customs smelters report business as satisfactory at 26 $\frac{1}{2}$ c. The London market reacted sharply to this downward movement and three-months metal was traded as low as £203 on Thursday, but the market soon recovered on the news of labour trouble in Rhodesia and the threat of an overtime ban by certain European workers. The deadline for the commencement of this ban is now past.

Another factor adding background support to the market is the expectation that on Friday a formal announcement will be made relaxing the restrictions on the export of copper to Russia. From

Chile comes reports that the Soviet Union was in the market for 20,000 tons of Chilean copper wire and that talks had already opened. However, the main feature overhanging the market at the present time is the progress, or rather lack of progress, of the Minerals Stabilization Bill through the House of Representatives.

Latest reports indicate that the passing of the Bill this session is in the balance. Pressure is increasing that the adjournment of Congress, already overdue, should take place at the end of the week, and it seems that the House Rules Committee will not have finished their deliberations in time to get the Bill through with the necessary financial appropriation during the few days left. It will be recalled that the recovery in copper prices stemmed initially from the proposal incorporated in this Bill to stockpile 150,000 tons of the metal at up to 27 $\frac{1}{2}$ c.

Although demand both in the U.S. and on the Continent has certainly shown an improvement in recent weeks, the market could hardly overlook the fact that an appreciable tonnage was not going to be absorbed in this way, particularly bearing in mind the recently announced production increase by Kennecott.

Meanwhile, U.S. sources estimate that July shipments of producer copper may total about 80,000 tons compared with the May figure of 78,631 tons. In June,

shipments were as high as 100,296 tons, but in this case a substantial tonnage was bought against the near certainty that the reimposition of the U.S. duty would be accompanied by a rise in the producers' quotation. In U.K. official warehouses, stocks at the end of last week were unchanged at 12,457 tons.

TIN BACK AGAIN

Once again the tin market has slipped back to the buffer stock support level and the manager has had to absorb a fair quantity of cash metal, the greater part of which was believed to be of Russian origin. Although the selling of Russian tin has not been so prominent in recent weeks, some quarters suggest that their material will continue to come forward during the next few months. It is understood that a member of the Russian trade delegation in London has confirmed that the Soviet Embassy in London had written to the International Tin Council at about the time of their last meeting, expressing their willingness to join the scheme as an observer.

It is disappointing to note that the improvement which took cash tin up to £735 following the Council's action in making an additional 8 per cent cut to 48 per cent in the export quota has proved so shortlived. Undoubtedly, the market is at present suffering from the quietness of consumer demand but it remains to be seen whether prices will react favourably when the anticipated revival of buying interest, especially in the U.S., actually takes place.

Total U.S. tin stocks increased during May from 33,710 tons to 34,300 tons, whilst during the same period metal afloat to the U.S. increased 1,045 tons to 2,980 tons. Stocks in U.K. official warehouses showed a decrease of 216 tons to 17,532 tons. On Thursday morning the Eastern price was equivalent to £752 $\frac{1}{2}$ per ton c.i.f. Europe.

LONDON METAL AND ORE PRICES, AUG. 14, 1958

METAL PRICES

Aluminium, 99.5%, £180 per ton
Antimony—
English (99%) delivered, 10 cwt. and over £190 per ton
Crude (70%) £190 per ton
Ore (60%) bases 19s. 6d./20s. 6d. nom. per unit, c.i.f.
Arsenic, £400 per ton
Bismuth (min. 1 ton lots) 16s. lb. nom.
Cadmium 10s. 0d. lb.
Cerium (99% net), £16 0s. lb. delivered U.K.
Chromium, Cr. 99% 6s. 11d. lb.
Cobalt, 16s. lb.
Germanium, 99.99%, Ge. kilo lots 2s. 8d. per gram
Gold, 250s. 34d.

Iridium, £20/£22 oz. nom.
Lanthanum (98/99%) 15s. per gram.
Manganese Metal (96% - 98%) £290
Magnesium, 2s. 5½d. lb.
Nickel, 99.5% (home trade) £600 per ton
Osmium, £17/£18 oz. nom.
Osmiridium, nom.
Palladium, £5/£5 15s.
Platinum U.K. and Empire Refined £23 5s. oz.
Imported £19 0s./£21 0s.
Quicksilver, £79 0s. ex-warehouse
Rhodium, £40/£42 oz.
Ruthenium, £14/£16 oz. nom.
Selenium, 50s. 0d. per lb.
Silver, 75d. f. oz. spot and 74½d. f'd.
Tellurium, 15s./16s. lb.

ORES AND OXIDES

Bismuth 65% 8s. 6d. lb. c.i.f.
18/20% 1s. 3d. lb. c.i.f.
Chrome Ore—
Rhodesian Metallurgical (semifriable) 48% (Ratio 3:1) £15 15s. 0d. per ton c.i.f.
.. Hard Lumpy 45% (Ratio 3:1) £15 10s. 0d. per ton c.i.f.
.. Refractory 40% £11 0s. 0d. per ton c.i.f.
.. Smalls 44% (Ratio 3:1) £14 0s. 0d. per ton c.i.f.
Baluchistan 48% (Ratio 3:1) £11 15s. 0d. per ton f.o.b. nom.
Columbite, 65% combined oxides, high grade £22 13s. 3d. per ton ex. works
Fluorspar—
Acid Grade, Flotated Material 156s. 0d. ex works
Metallurgical (75/80% CaF₂)
Lithium Ore—
Petalite min. 34% Li₂O 40s. 0d./45s. 0d. per unit f.o.b. Beira
Lepidolite min. 34% Li₂O 40s. 0d./45s. 0d. per unit f.o.b. Beira
.. Amblygonite basis 7% Li₂O £25 0s. per ton f.o.b. Beira
Magnesite, ground calcined £28 0s./£30 0s. d/d
Magnesite Raw (ground) £21 0s./£22 0s. d/d
Manganese Ore Indian—
Europe (46% - 48%) basis 67s. 6d. freight nom.
Manganese Ore (43% - 45%) nom.
Manganese Ore (38% - 40%) nom.
Molybdenite (85% basis) 8s. 5d. per lb. (f.o.b.)
Titanium Ore—
Rutile 95/97% TiO₂ (prompt delivery) £35/£36 per ton c.i.f. Aust'n.
Ilmenite 52/54% TiO₂ £11 10s. per ton c.i.f. Malayan
Wolfram and Scheelite (65%) 62s. 6d./67s. 6d. per unit c.i.f.
Vanadium—
Fused oxide 95% V₂O₅ 8s. 11d. per lb. V₂O₅ c.i.f.
Zircon Sand Australian (65 - 66% ZrO₂) £14 0s. per ton c.i.f.

LEAD-ZINC IN DOLDRUMS

The lead and zinc markets have been quiet and featureless and, as already has been stated, both metals are awaiting a cue as to whether the Mineral Stabilization Bill will be passed. Consumer demand has been no better than routine. The American Zinc Institute report that although total shipments of slab zinc during July rose some 5,500 tons to 60,187 tons, the highest figure since December, 1957, end-month stocks also showed an increase of some 5,000 tons over June's figure and stand at 257,911 tons.

Closing prices are as follows:

	Aug. 7		Aug. 14	
	Buyers	Sellers	Buyers	Sellers
COPPER				
Cash	£203½	£203½	£206½	£206½
Three months ..	£203½	£204	£206½	£207
Settlement ..	£203½		£206½	
Week's turnover	7,450 tons		7,450 tons	
LEAD				
Current ½ month	£72½	£72½	£69½	£69½
Three months ..	£73	£73½	£71	£71½
Week's turnover	3,325 tons		3,900 tons	
TIN				
Cash	£730½	£731	£730	£730½
Three months ..	£734	£734½	£730	£730½
Settlement ..	£731		£730½	
Week's turnover	470 tons		1,285 tons	
ZINC				
Current ½ month	£64½	£64½	£63½	£63½
Three months ..	£65	£65½	£64½	£64½
Week's turnover	3,050 tons		7,050 tons	

Mining Finance

Rooderand Looks Better Now

Investors looking for a low-priced finance share combining growth prospects with a chance of more spectacular returns might well consider the claims of Rooderand Main Reef, now standing at around 3s.

Rooderand has been an unpopular counter for some time past. Rather more than 50 per cent of the book value of the portfolio is held in Freddie's Consolidated and in Free State Development. As a result, the shares have always tended to move with Freddie's, and the disappointments at that producer, caused no little money to be lost by Rooderand holders—the shares stood as high as 14s. nine years ago.

Nevertheless, the fortunes of Rooderand are by no means as intimately bound up with Freddie's as might appear. The portfolio was worth just over £1,000,000 a year ago at market prices then ruling, while net current assets brought the total to something like £1,128,000, or about 4s. 7d. per share on the £1,200,659 issued capital. If it is assumed that about one-quarter of this is attributable to the Freddie's holding, the asset value is about equal to the market value.

The growth prospects lie in the investment portfolio. This includes such shares as Hartebeestfontein, Middle Wits (an

active market these days on rumours of an imminent Zandpan flotation), Geofries, who will have a substantial stake in the new Loraine-Riebeeck property, and Anglovaal, whose interests are probably more diversified than those of any of the other mining houses.

The spice is added by two important ventures in which Rooderand Main Reef has rights. The more important of these is the area known as the J.C.I. Western prospect, which lies some twenty miles south of the town of Randfontein. Drilling on this area has proved large tonnages of medium-grade ore at mineable depths, but further development has been shelved for the time being in view of the uncertainty caused by the effects of inflation on any capital programme. Nevertheless, it can only be a matter of time before one or more mines are promoted to exploit this area.

Equally promising is the company's 20 per cent interest in any prospecting ventures undertaken by Anglovaal Rhodesian Exploration Co. These rights are a comparatively recent acquisition, and the only tangible results so far are interests in various exploration companies investigating mineral deposits in the Rhodesias, in particular the Anglovaal Charterland Exploration Co., which is prospecting a 10,000 sq. mile concession

in Northern Rhodesia. No results have yet been announced.

It would thus seem that, via Rooderand, an interest in these two ventures can virtually be acquired for nothing, even after completely writing off the Johnnies holdings. Should this appear too long-term a prospect, however, it should be noted that net profits are now running at about £60,000 per year—sufficient to pay a 3d. dividend—with good prospects for growth in the meanwhile.

WILLIAMSON'S SELLS FOR £4,000,000 PLUS

Speculation about the price De Beers and the Tanganyika Government would pay for the capital of Williamson Diamonds was ended this week by the announcement that the two purchasers will have to find some £4,140,000 plus death duties. This figure is considerably below some earlier guesses, which ranged as high as £30,000,000.

The agreement, signed by the partners on Wednesday but not yet ratified by the Tanganyika authorities, provides *inter alia*: that a new lease will be granted to the company, royalties remaining at 15 per cent; that should it be necessary to make production cuts in the diamond industry, Williamson's output will not be curtailed to a greater degree than that of any other company of the De Beers group; and that the Diamond Corporation will offer a new sales contract, to be approved by the government, on expiry of the current arrangements in 1960.

Last year's output at the Mwadui mine was worth some £3,025,000, over 40 per cent of which was of gem quality. This was equivalent to about 9 per cent of world sales.

ALUMINIUM LTD.'S HALF-YEAR

Results of Aluminium Ltd. for the first half of 1958 are probably neither worse nor better than might have been expected. Consolidated net income amounted to \$10,451,000, equivalent to some 35 c. per share, against \$26,548,000 in the corresponding period of last year (88 c. per share). The Aluminum Co. of Canada, whose accounts are consolidated with those of Aluminium Ltd., reports similar experience, with net earnings more than halved at \$9,954,666, compared with \$19,861,224.

The effect on demand of the 2 c. cut in primary aluminium is apparent in the company's sales figures. Total sales in the first quarter of the year amounted to 128,000 tons, while in the second quarter, after the price had been reduced, sales rose to 150,000 tons, only 6,000 tons lower than in the second quarter of 1957. Nevertheless, production was still out-running demand, and a cut in the production rate was announced at the end of July which reduced output to about 72 per cent of installed capacity.

Whether this cut, in conjunction with earlier reductions and last year's decision

LONDON MARKET HIGHLIGHTS

It is a rare week indeed that fails to produce a burst of activity in at least one of the sections of the mining market on the London Stock Exchange. But the past week saw no concerted action anywhere in mines and such features as occasionally developed were very small beer compared with the activity that was seen in industrial sections.

As far as copper shares were concerned, most of the earlier ebullience faded as it became increasingly likely that the U.S. Minerals Subsidy Bill might not be passed by Congress before the close of the present session. There was a fair amount of activity in Bancroft, however, and buyers were still about for the Messina issues; the last named being South African producers, who benefited to some extent by their immunity from new rumblings of Copperbelt labour unrest.

Wankie Colliery provided one of the few bright spots with a rise to their best this year of 17s. following persistent support from Africa in front of the final dividend due soon. Dividend hopes were also responsible for the only active feature of the tin market. The share in question was the tin and wolfram producer, Beralt. Despite the obscure outlook for the two metals it was felt that the shares looked cheap in relation to the company's strong financial position and they quickly rose to 26s. 3d.

Gold shares once again followed a steady but rather uninteresting course.

Were it not for the activity in other parts of the "House", the Kaffir market would probably have given a better reception to the record July gold production figure and the unexpected increase in the African labour force.

A certain amount of Cape interest developed in Middle Wits on the theory that the Zandpan flotation must be getting very near. Middle Wits touched a 1958 high of 16s. 1½d. before interest waned. A flurry of buying carried Central Mining up to 67s. 6d. after the news that the company's Centramic subsidiary had helped to provide further financing for the Western Decalta Petroleum project.

Among non-South African gold shares, two encouraging pieces of news cheered the shareholders concerned. The first was the good development results disclosed in the June quarterly report of Ariston, the Ghana gold producer. Ariston improved to 4s. 1½d. The second piece of news concerned Yukon Consolidated, whose shares rose to 4s. 10½d. on the president's forecast of good prospects for the current dredging season.

Less happy was the effect on the Diamond section of the latest Soviet claim to have discovered new diamond fields, which depressed "Casts" by 9d. to 13s. 6d. De Beers also lost ground, but later both shares rallied and finally made up most of their earlier losses.

On Thursday the Bank Rate was reduced to 4½ per cent.

to defer the completion of new capacity in Canada, will be sufficient to reverse the market has yet to be seen. Nevertheless, aluminium is still a "new" metal in the sense that new markets are being found all the time, and the long-term outlook remains good.

ARISTON REPORTS GOOD DEVELOPMENT

Among this week's quarterly reports from the Western Selection group of West African gold producers was news of promising development at Ariston Gold Mines.

On the 25th level, North Orebody, values encountered included 13.5 dwt. over 65 in. and 9.2 dwt. over 82 in., while on the 27th level 5.4 dwt. over 78 in. was among the disclosures. These values are important in relation to Ariston's plans for mining down to the 30th level on this orebody. It would seem that the grade encountered is holding up well in the deeper levels of the mine.

On the No. 2 Orebody, exploitation of which is planned as far as the 40th level, a disclosure of 8.7 dwt. was made over 28 in. on the 30th level. This was the first intersection at this depth and its significance lies, not in the values encountered, but in the indication that the reef is continuing to dip steadily at depth. This is of primary importance for the planning of future operations.

Financial News and Results

Berjuntai Strengthens the Defences.—In spite of an increase from £122,864 to £166,950 in taxed profits, Malayan-registered Berjuntai Tin Dredging has declared dividends totalling 1s. per share in the year ended April 30 last, absorbing £98,928. Last year's total (part of which was on a smaller capital) was 2s. 9d., absorbing £121,796. The additional unappropriated profit has gone to swell Berjuntai's already strong net current assets which now amount to more than £1,000,000. This is a wise precaution necessitated both by the general outlook for tin producers in the near term, and by the considerable expenditure still to be incurred by the company in the reconstruction of its No. 3 dredge.

Kramat's Profits, Dividend Halved.—In the year ended March 31 last, a fall of over £80,000 in revenue from tin and other sources reduced net profits after tax of Kramat Tin Dredging to £26,028

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against £61,974 in the previous year. A single dividend of 9d. per share was declared in July, against one of 1s. 6d. in 1957, leaving £71,503 to be carried forward against £44,179 brought in.

Ribon Valley's Year.—Unaudited preliminary figures from Ribon Valley (Nigeria) Tinfields show profits before tax severely reduced from £10,136 last year to £5,786 in the year to March 31, 1957. Tin revenue was only fractionally lower at £129,573, but the collapse in the market for columbite brought down the revenue from that source to £217 against £21,152. A dividend of 2½ per cent is proposed (1957: 7½ per cent) leaving the carry forward £2,000 higher at £19,671. Meeting, London, Sept. 11.

Tehidy Revenues Hold Up Well.—In spite of the steady decline in metal prices during 1957, revenues from the properties owned by Tehidy Minerals were well

maintained at £9,815 compared with £10,652 in 1956. Gross profits were £16,734 (1956: £18,710), while taxation absorbed £8,586 against £10,268. A final dividend of 12½ per cent is recommended, making, with the interim of 5 per cent, a total of 17½ per cent absorbing £7,396. Last year's distributions totalled 20 per cent. Meeting, Camborne, August 30.

Sungei Kinta.—The 1957 profits of Sungei Kinta Tin Dredging were sharply reduced by the lower tin price, higher costs, and the burden of buffer stock contributions. O.T.C. status has, however, enabled the company to write back almost £26,000 of provisions no longer required, in addition to reducing taxation for the year to £6,953 from £39,870, leaving net taxed profits higher at £31,401 against £26,531. The proposed final payment of 1s. per share makes a total of 2s. for the year against 4s. 6d. in 1956. Meeting, London, August 20.

Rand & Orange Free State Returns for July

Company	July 1958			Year ends	Current Financial Year			Last Financial Year		
	Tons (000)	Yield (oz.)	Profit† (£000)		Tons (000)	Yield (oz.)	Profit† (£000)	Tons (000)	Yield (oz.)	Profit† (£000)
Goldfields										
Doornfontein	88	36,753	196.4	J	88	36,753	196.4	85	34,735	181.2
Libanon	98	22,831	55.4	J	98	22,831	55.4	102	22,850	53.2
Luipards Vlei	70	12,236	5.1	J	70	12,236	5.1	73	12,904	115.7
Rietfontein	22	4,902	12.2	D	155	35,212	92.0	171	39,607	113.1
Robinson	72	15,851	3.4	D	501	107,429	37.2	525	106,856	61.7
Simmer & Jack	90	16,855	14.3	D	608	116,816	100.1	669	123,689	129.3
Sub Nigel	66	15,993	26.7	J	66	15,993	26.7	66	16,795	26.8
Venterspost	128	31,821	59.9	J	128	31,821	59.9	127	30,219	63.6
Vlakfontein	50	17,633	87.3	D	346	122,064	591.3	347	124,045	596.7
Vogels	95	21,233	44.2	D	670	150,277	308.1	691	160,484	502.5
West Drie	80	76,010	624.5	J	80	76,010	624.5	75	71,765	635.3
Anglo American										
Brakpan	129	16,504	14.0	D	869	115,918	85.3	745	127,161	82.5
Daggas	242	49,726	265.5	D	1,606	334,915	1746.6	1,597	351,160	1922.2
East Daggas	94	15,493	31.0	D	635	105,392	195.0	665	109,865	241.7
F.S. Geduld	70	50,200	355.4	S	657	470,513	3244.1	520	567,477	1629.4
Lorraine	75	14,182	12.1	S	667	125,740	1,191.0	626	121,628	1,63.7
President Brand	96	70,779	587.0	S	793	592,167	4797.6	625	476,757	3914.7
President Steyn	100	37,831	203.4	S	948	396,047	2036.2	906	348,763	1983.8
S.A. Lands	92	18,853	56.1	D	621	137,096	363.6	630	135,002	458.4
Springs	129	14,661	9.2	D	884	98,700	59.2	885	96,114	40.7
Vaal Reefs	76	34,507	197.4	D	492	221,253	1249.2	414	181,248	1070.1
Welkom	92	27,082	78.2	S	846	250,267	693.2	859	175,349	491.9
Western Holdings	100	56,004	415.3	S	969	521,792	4559.3	939	436,457	2917.7
West Reef Ex.	114	26,794	67.2	D	783	183,610	430.0	856	185,381	449.8
Central Mining										
Blyvoor	106	66,967	480.5	J	106	66,967	480.5	109	64,421	470.8
City Deep	115	23,865	12.2	D	940	182,312	64.0	1,036	204,790	120.8
Cons. M.R.	136	21,087	13.3	J	136	21,087	13.3	168	24,114	10.0
Crown	240	36,145	17.1	D	1,602	244,245	109.5	1,675	244,678	112.0
D. Roopepoort	242	39,033	53.4	D	1,261	228,051	353.1	1,283	225,021	361.0
East Rand Prop.	242	59,357	156.6	D	1,456	396,486	1040.7	1,510	392,586	893.4
Harmony	85	32,716	120.3	J	85	32,716	120.3	88	35,214	189.8
Modder East	146	13,761	2.0	J	146	13,761	2.0	145	14,490	4.0
Rose Deep	60	7,176	3.2	D	402	52,569	24.2	347	52,979	2.5
J.C.I.*										
E. Champ. d'Or	14	292	129.9	D	86	2,160	1,190.1	85	2,374	1,185.7
Freddies Cons.	58	14,603	150.0	D	359	106,335	1,256.0	402	104,135	1,137.2
Govt. G.M.A.	63	11,430	0.0	D	437	76,809	7.9	776	130,240	1,64.9
Randfontein	32	4,629	5.2	D	204	32,553	35.5	527	88,033	75.9
Union										
East Geduld	136	41,818	289.7	D	889	273,391	1861.1	969	297,819	2098.5
Geduld Prop.	78	13,071	7.6	D	557	89,326	62.7	711	112,709	181.8
Grootvlei	205	43,577	223.9	D	1,370	291,767	1487.0	1,357	290,329	1524.2
Marievale	74	19,347	86.3	D	497	130,412	576.3	497	130,519	585.5
St. Helena	124	36,311	197.2	D	816	239,690	1182.6	812	236,714	1303.9
Van Dyk	80	14,997	30.5	D	531	97,799	178.8	543	92,299	49.7
General Mining										
Buffelsfontein	117	39,172	182.5	J	117	39,172	182.5	110	36,290	175.8
Ellaton	32	7,460	32.7	D	224	51,956	220.1	228	48,765	115.5
S. Roopepoort	31	7,322	26.1	J	31	7,322	26.1	30	7,070	25.7
Stilfontein	117	57,310	392.0	D	777	384,594	2462.3	686	301,246	1908.6
W. Rand Cons.	134	19,492	22.7	D	992	127,608	101.3	1,006	146,301	121.7
Anglo-Transvaal										
Hartebeestfontein	87	47,415	314.4	J	87	47,415	314.4	86	47,300	322.4
N. Klerksdorp	10	1,088	1.8	D	71	7,615	1,54.7	73	8,646	1,39.1
Rand Leases	174	25,578	7.6	J	174	25,578	7.6	134	27,666	12.5
Village M.R.	28	4,693	2.0	J	28	4,693	2.0	34	5,544	7.4
Virginia O.F.S.	105	27,195	44.2	J	105	27,195	44.2	101	26,922	71.1
Others										
N. Kleinfontein	87	10,354	1.3	D	627	74,469	1,32.7	690	80,255	1,46.6
Wit. Nigel	18	4,423	7.0	J	18	4,423	7.0	18	4,303	7.9

Gold has been valued at 250s. 0d. (June 249s. 0d.) per oz. fine. L indicates loss. † Working Profit. *Working Profit includes sundry revenue. Table excludes profits from Uranium, Pyrite and Acid, and also production from Uranium divisions at Luipards Vlei, Randfontein and W. Rand Consolidated.



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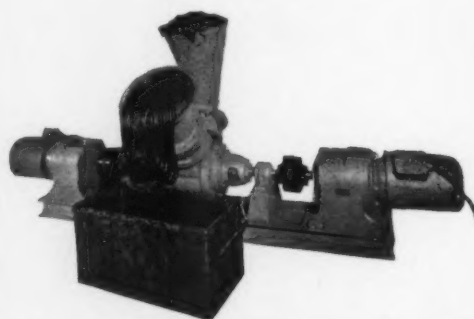
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